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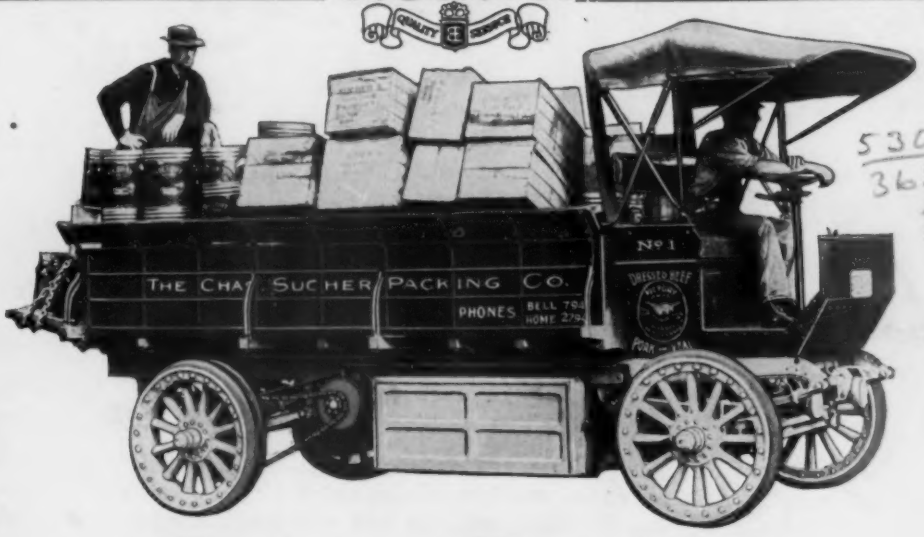
THE COMMERCIAL CAR JOURNAL

Entered as Second-Class Matter at the Post Office at Philadelphia, Pa.

Baker Electrics



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cost more than any other electrics now being manufactured, and they should. Every extra dollar put into their construction is worth ten to the owner in the saving of repair bills for ten years to come

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While 54 competing makes of 2-ton trucks average in price $2701, this Reo Model J chassis at $1800 equals the best, and includes features that none of them have.

Reo Sectional Radiator, of 24 separate, interchangeable units, may be repaired on the road anywhere; motor, clutch and transmission are cushioned on a sub-frame, away from jars and shocks; left-side drive, and the best and handiest center control ever brought out; big armored front frame; demountable driver's cab; gas headlights and Prest-O-Lite tank — these are some of the features that turn inquiries and demonstrations into actual sales.

Our advertising is well organized and liberal. We constantly maintain experienced sales representatives and expert traveling mechanics in the field.

We want responsible dealers for some open territory — dealers who appreciate our attractive line and will work with us — to build up a permanent clientele of desirable customers.

Why not investigate?

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Reo Motor Truck Company

Manufacturers

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THE PUBLISHERS' PERSONAL PAGE

YOU CAN HELP!

Every one of our readers is vitally interested in the success of the commercial car industry.

Of course, no one questions the success of the commercial car or, in fact, of the commercial car industry as a whole.

But that something is wrong is apparent, or a big concern such as the American Locomotive Company would not give it up, and so many of the smaller concerns, many of them well managed, would not be compelled to quit. Also some of the older, larger and well-established concerns would not show such poor balance sheets.

It seems to be an accepted fact that thus far very little profit has been made by commercial car manufacturers.

Now an industry cannot be said to be completely successful, unless the majority of those interested in it are successful.

What is the Reason?

Why is it that the manufacturers of commercial motor cars and the agents who sell them are not making as great and as sure a profit as is made in other similar lines?

We have given our opinion of the cause, on the editorial page of this issue, under the title. "Is Commercial Car Manufacturing a Profitable Business?"

While we believe that we have pointed out the real trouble, we may be wrong, and in such case we are willing to be shown.

Our readers are all men who are interested in the manufacture or sale of commercial motor cars or who use one or more of them in their business, and are, therefore, deeply interested in this subject; the manufacturers and dealers more vitally than the owners; but the owner knows that if the factory which made his car gets into trouble or the dealer who sold it to him does so, that he will have no one to help him should he get into trouble.

Full discussion of a subject such as this is absolutely essential to arrive at an intelligent conclusion, one that will be of universal benefit.

We ask all our readers to write us their opinion as to the reason why commercial car makers and agents are not making the profits they are entitled to; and also to propose a remedy for the cure of the trouble, whatever it is.

If we are right in our belief that the incompetent driver is at the bottom of it all, then it is up to everyone concerned to help eliminate incompetent drivers.

Some will say that it is an impossible task; and perhaps it is impossible to entirely eliminate the incompetent drivers, but surely it is possible to educate enough competent drivers to go around, so that the incompetents will either have to become competent or look elsewhere for employment.

Organization is Necessary

An organized movement in which manufacturers, dealers and owners all joined hands would accomplish wonders in a very short time.

Co-operation is essential. The large companies, which now have extensive and complete service organizations and have established service stations in the large cities, will find that the increase in the number of competent drivers will mean a great saving to them. They cannot afford to establish these stations in every town in the country, and they have many agents.

The smaller manufacturer, who must depend on his local agents entirely to take care of this important detail, cannot afford to neglect this matter; and the dealer or agent, who stands the brunt of the loss, must act in self-protection.

The owner, too, is interested in getting good service at as low a cost as he possibly can, and should lend a hand in bringing about this desirable end.

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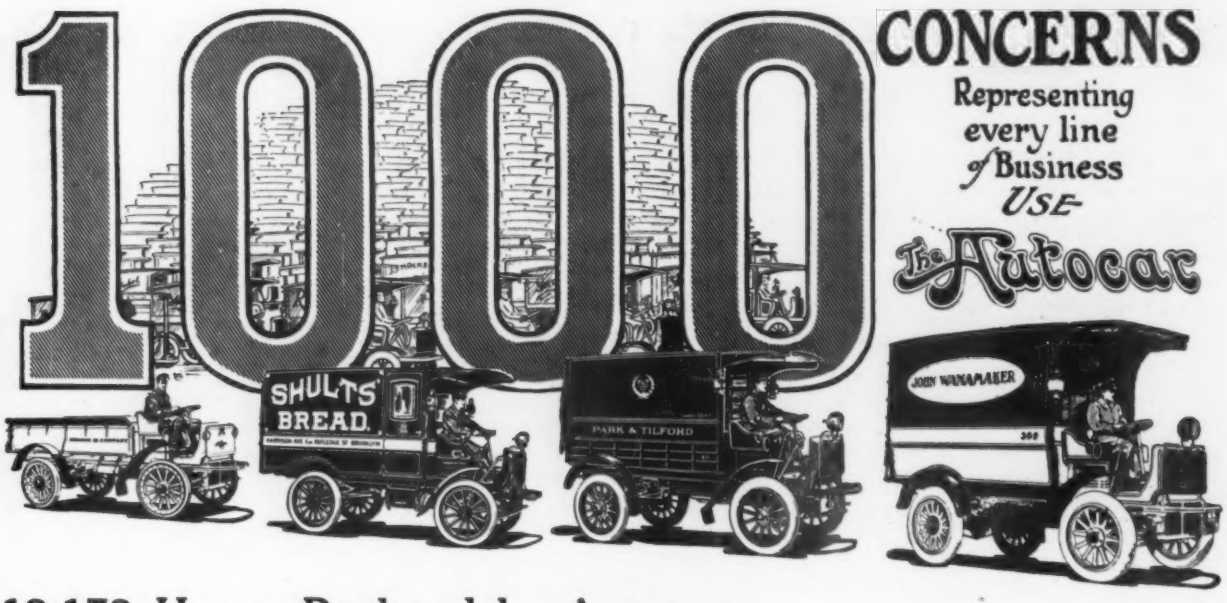

13,173 Horses Replaced by Autocars in the Service of More Than 1000 Concerns

THE RAPIDLY increasing use of commercial motor vehicles by progressive firms suggests the following questions to those who have not yet adopted them:

1. Am I in a position to compete with merchants who have motor delivery equipment?
2. What make of car will provide me with the most dependable service and assist in enlarging my list of customers?
3. How many more people in outlying districts would buy from me if I were enabled to **reach them daily** by the prompt service of AUTOCARS?

More than 1000 business houses have satisfactorily answered these questions by purchasing the AUTOCAR—built by **motor delivery car specialists.** Repeat orders from a large proportion of them testify to the correctness of their judgment. Now is the time to modernize **your** delivery service and place yourself in a competitive position by adopting the AUTOCAR. There is **greater business opportunity** for every AUTOCAR Owner.

FOLLOWING ARE A FEW OF THE MANY AUTOCAR OWNERS: (They have from 1 to 188 Autocars each)

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STANDARD SUPPLY & EQUIPMENT CO.
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AMERICAN SOCIETY PREVENTION CRUELTY TO ANIMALS
JAMES BOYD & BROTHER, Inc.
SEARCHLIGHT GAS CO.
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THE AUTOCAR COMPANY, ARDMORE, PA.

ESTABLISHED 1897

PHILADELPHIA	NEW YORK	NEWARK	BOSTON	PROVIDENCE
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When Writing, Please Say—"Saw Your Ad. in the C C J"

The Commercial Car Journal

VOLUME VI PHILADELPHIA, SEPTEMBER 15, 1913 NUMBER 1

AUTOMOBILE CHAMBER OF COMMERCE HAS SECURED A REDUCTION IN FREIGHT RATES ON COMMERCIAL AND PLEASURE CARS

The negotiations that the Automobile Chamber of Commerce has been carrying on with the Transcontinental Freight Bureau, has resulted in a concession in the freight rates on transcontinental shipments ranging from 5 per cent. to 15 per cent. The rates granted are as follows: Group A, $2.80; group B, $2.70; group C, $2.60, and group D, $2.50. The minimum carload weights for 36 ft. and 40 ft. cars are 12,500 lbs., and for 50 ft. cars, 15,000 lbs. The rates formerly charged were $3.30, $3.20, $3.10 and $3.00 respectively. The classification which reads, "Automobiles, Passenger and Freight" has been amended to include fire apparatus, hearses and tractors.

Another important privilege secured was that of shipping engines or engine parts or gear parts or wheel rims or channels as part of a carload of complete machines, instead of being subject to less than carload as formerly, when placed in the cars with complete machines.

FORTY-FIRST ANNUAL CONVENTION AND FIRE APPARATUS EXPOSITION OF THE INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS

The 41st Annual Convention and Fire Apparatus Exposition of the International Association of Fire Engineers took place in the Grand Central Palace, N. Y. City, September 1st to 6th. The exhibition occupied two entire floors, and was notable for the fact that every piece of modern fire apparatus shown was motor driven, with the exception of one hose reel, which was designed to be drawn by the firemen themselves. The exhibitors included the American LaFrance Fire Engine Company, who had an exceptionally large exhibit of their well known Manly Drive Motor Fire Wagons; the International Motor Company of New York City, who exhibited a Mack tractor attached to a hook and ladder wagon; the Packard Motor Car Company, the Knox Automobile Company, Seagrave Company, Pope Manufacturing Company, Nott Fire Engine Company, Jas. Boyd & Brother, Martin Tractor Company, Ahrens-Fox Company, Front Drive Motor Company, all of which exhibited motor fire apparatus. The Sheldon Axle Company, the Timken Axle Company, S. F. Bowser & Company, Republic Rubber Company, B. F. Goodrich and the Sewell Wheel Company exhibited parts and accessories.

As a part of the programme of the convention, papers were read on "Motor Apparatus; its Durability, Efficiency and Economy," by fire chief A. V. Bennett of Birmingham, Ala.; "British Fire Engines," by Arthur Reginald Dyer, Assistant Chief of Fire Brigade, London, England, and "The Gasoline Motor Pumping Engine; its Defects and Cost of Operation and Maintenance," by Chas. S. Demarest, Chief of Construction, Fire Dept., New York City.

ELECTRIC CARS WILL BE PROMINENT AT THE NEW YORK ELECTRICAL SHOW

At the New York Electrical Show, which takes place at the Grand Central Palace, N. Y. City, from October 15th to 25th, electric motor cars will hold the premier position. The show this year bears the title of "Electrical Exposition and Motor Show," and a special committee of the New York Electric Vehicle Association has charge of the automobile section, which will occupy the entire third floor of the Grand Central Palace.

The committee in charge is composed of E. W. Curtis, General Vehicle Company; J. H. Cafferty, General Motor Truck Company; Nathaniel Pratt, Baker Vehicle Company; S. W. Menefee, Anderson Electric Car Company; C. Y. Kensworthy, R. & L. Electric Car Company; Chas. A. Ward, Ward Motor Vehicle Company; W. R. Chandler, Holt-Chandler Company; W. C. Poertner, Poertner Motor Car Company; J. M. Barrett, Automatic Transportation Company; Harvey C. Robinson, New York Edison Company; H. C. Fling, New York Electric Vehicle Association.

Two important features of this show will be a demonstration track, oval in shape, of about 300 ft. in length, and a model electric garage. The garage will be used for the storage and maintenance of electric cars, which will be demonstrated on the track, and it will be equipped exactly as a city garage should be equipped. All the latest appliances, such as vacuum cleaners, polishing motors, electric tire pumps and patented car washing devices will be maintained and demonstrated. The Electric Vehicle Association has arranged for a special staff of demonstrators on the floor. There will also be a model repair shop and a model battery room, which will be equipped with all sorts of electrical apparatus, and tools for repair work driven by electric motors supplied by the United States Electric Company.

The Electrical Storage Battery Company, Edison Storage Battery Company, Philadelphia Storage Battery Company and the Gould Storage Battery Company are supplying most of the material for the garage, repair shop and battery room. From the advance information given out, this show promises to be one of the most important events in the history of the electric vehicle.

MANUFACTURE OF ALCO COMMERCIAL AND PLEASURE CARS ABANDONED

The American Locomotive Company has announced that it will discontinue the manufacture of commercial motor cars and pleasure cars, and the cars on hand are offered at prices very much reduced from those at which their cars had previously been listed. The announcement also states that the company will take care of purchasers of the cars on the matter of repairs or replacements for a period of five years.

It has been common knowledge among the trade that the American Locomotive Company has lost considerable money in its Automobile Department, but as the department had

been reorganized only a few months ago, the announcement of its abandonment came as a distinct surprise.

C. A. Benjamin, who was recently appointed sales manager of the Automobile Department of the company, remains with the company, as his contract has a considerable period to run. The American Locomotive Company has been building automobiles for eight years. During the past three years it has specialized on commercial motor cars, having almost discontinued the manufacture of pleasure cars, and statements have been made recently, showing that its automobile department had been making good progress.

No attempt has been made to dispose of any of the plants or special machinery or tools used in the automobile manufacture or of any of its branch houses located in the principal cities, although it is probable that something will be done in this respect when the stock of cars on hand has been disposed of.

COAST TO COAST HIGHWAY

The movement to establish a highway from the Atlantic Coast to the Pacific Coast, across the United States, which was inaugurated by C. G. Fisher, of the Prest-O-Lite Company, about two years ago, has been gaining ground very rapidly, and within the past month has taken on more definite form.

A national association has been formed with the title, Lincoln Highway Association, Incorporated, with headquarters at 2115 Dime Savings Bank Building, Detroit, Mich., and the Coast to Coast Highway has been named the Lincoln Highway.

The directors of the association are Henry B. Joy, Packard Motor Car Company, Detroit, Mich.; Carl G. Fisher, Prest-O-Lite Company, Indianapolis, Ind.; Russel A. Alger, Alger, Smith & Company, Detroit; Roy D. Chapin, Hudson Motor Car Company, Detroit; F. A. Seiberling, Goodyear Tire & Rubber Company, Akron, O.; A. Y. Gowen, Cleveland Builders' Supply Company, Cleveland, O.; P. H. Deming, George Worthington Company; J. N. Willys, Willys-Overland Company, Toledo, O.; Albert J. Beveridge, ex-Senator, Indiana; A. R. Pardington, N. Y. City, and E. W. Clark, First National Bank, Detroit, Mich.

Mr. Joy is president; Mr. Fisher, vice-president; Mr. Pardington, secretary, and Mr. Clark treasurer. The route of the highway as announced by the association goes through the following principal cities: New York City, Jersey City, Newark, Trenton, Camden, Philadelphia, York, Gettysburg, Chambersburg, Pittsburgh, Beaver Falls, Canton, Mansfield, Lima, Fort Wayne, Elkhart, Laporte, Chicago Heights, Joliet, Geneva, Sterling, Fulton, Lincoln, Cedar Rapids, Marshalltown, Grand Junction, Council Bluffs, Omaha, Fremont, Columbus, North Platte, Denver, Cheyenne, Evanston, Salt Lake City, Austin, Reno, Carson City, Sacramento, Stockton, Oakland and San Francisco.

The states through which the highway will pass are New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Iowa, Nebraska, Colorado, Wyoming, Utah, Nevada, California. The cost of this highway is estimated at $10,000,000, half of this amount having been already subscribed for, and it is expected as soon as the announcement has gone broadcast through the land that the other half will be speedily furnished.

CHARLES B. SHANKS QUITS THE KELLY-SPRINGFIELD MOTOR TRUCK COMPANY

Charles B. Shanks, one of the veteran sales managers in the automobile and commercial car industry, has severed his connection with the Kelly-Springfield Motor Truck Company, of Springfield, O., owing to a dispute over the five-year contract which he entered into with the company a year ago, at which time E. S. Kelly was president of the company. Later Mr. Kelly disposed of the control of the company to the American Light & Traction Company, New York City, and at the same time the name was changed from the Kelly Motor Truck Company, to the Kelly-Springfield Motor Truck Company. Although the new company took over Mr. Shanks' contract, and fulfilled its terms as to salary and commissions for several months, it afterward refused to fulfill the contract, and as Mr. Shanks refused to recede from his position, a situation developed which forced him to quit.

NO COMMERCIAL CARS AT NEW YORK OR CHICAGO SHOWS

The New York and Chicago Automobile Shows will consist of pleasure vehicles exclusively. The distinction has been made very explicit by the phrase "passenger cars, designed for private use," thus eliminating 'buses and similar conveyances intended for public utility purposes.

A SUCCESSFUL FUEL AT THREE CENTS A GALLON

While making the run from Los Angeles to San Francisco in twenty-four hours and forty minutes in a Kissel Kar truck, O. W. Kern demonstrated to his satisfaction a new automobile fuel called "oil toppings." According to Kern, the entire trip covered was 472 miles, and the amount of fuel used was approximately 46½ gals., or an average of over ten miles to the gallon. The Kissel Kar used was a 1500-lb. capacity vehicle and a load of over 2000 lbs. was carried on the entire journey. When the amount of fuel at three cents per gallon is figured the extreme low cost of transportation of merchandise or freight by the new fuel is demonstrated.

The carburetor used was the "Master," which is the invention of Harry Miller, of Los Angeles, Cal. Kern stated that no trouble occurred during the trip, and the car came out successful on the many severe tests to which it was subjected.

Oil toppings is that portion of the refinings which float on the top of the tank and was formerly drained off and allowed to waste. It sells at three cents a gallon, and at that rate the total cost of fuel for the 472 miles was less than $1.40.

Knox Automobile Company, Springfield, Mass., announces that it will discontinue the manufacture of 5, 6 and 7 ton trucks, and hereafter devote its entire energies to the production of Fire Apparatus and Martin Tractors.

1914 KISSEL COMMERCIAL CARS

The Kissel Motor Car Company, Hartford, Wis., is bringing out a new series of Kissel Kar trucks for 1914. Instead of its old range of sizes, the new series in which there will be six sizes, are rated 1500 lb., 1 ton, 1½ ton, 2½ ton, 3½ ton and 6 ton. The new models will have left hand drive and center control. The starting and shifting levers are heavily nickeled. Motor is more compact and very easy of access. It has four cylinders, 4¼ x 5¼, the entire power plant being suspended on a subframe. The new cars will have a four speed transmission as before. All the important transmission parts are made of vanadium steel heat treated.

Swinehart Tire & Rubber Company, Akron, O., at its annual meeting on September 24th, contemplated increasing the capital stock from $800,000 to $1,000,000, additional capital to be used in enlarging the business.

Personal Items

Frank A. Groves has resigned as sales manager of the Speedwell Motor Car Company, of Dayton, O.

R. W. Knowles has been appointed engineer of the Truck Department of the Anderson Electric Car Company.

E. S. Maddock, assistant secretary of The Thomas B. Jeffery Company, Kenosha, Wis., has resigned his position.

Alvan Macauley, general manager of the Packard Motor Car Company, has been made also a vice-president of the company.

Frank W. Mailing, formerly factory superintendent for the Mais Company, has joined the forces of the Stewart Iron Works Company, Cincinnati, O.

E. A. Williams, formerly with the Castle Lamp Company, Battle Creek, Mich., has been made assistant manager of the Gramm Motor Truck Company, Lima, Ohio.

G. M. Berry, second vice-president and treasurer of the Thos. B. Jeffrey Company, Kenosha, Wis., has sold his stock and completely withdrawn from the company.

W. H. Durphy, formerly sales manager of the Chase Motor Truck Company, Syracuse, N. Y., has become sales manager for the Brockway Motor Truck Company.

F. N. Schwab has been promoted from the position of Chicago branch manager of the Speedwell Motor Car Company, of Dayton, O., to general sales manager of the company.

E. T. Georges, formerly consulting engineer of the General Motors Company, Detroit, Mich., has been appointed superintendent of the Chase Motor Truck Company, Syracuse, N. Y.

L. L. King has been appointed advertising manager for the Goodyear Tire & Rubber Company, Akron, O., succeeding H. S. Quine, who is now assistant to President F. A. Seiberling.

E. T. Klee has been appointed manager of the Truck Department of the Gibson Automobile Company, Indianapolis, Ind. He was formerly with the Mais Motor Truck Company.

F. W. Sutton, formerly with the American-LaFrance and F. B. Stearns Companies, has been made manager of outside production of the Continental Motor Manufacturing Company, Detroit, Mich.

L. A. Austin, formerly general manager of the Mais Motor Truck Company, of Indianapolis, Ind., has become general manager of the Truck Department of the O. Armleder Company, Cincinnati, Ohio.

H. S. Martin, general manager of the Eveland Engineering Company, of Philadelphia, Pa., and his wife were killed in the disastrous wreck on the New York, New Haven and Hartford Railroad, on September 2nd. Mr. Martin was returning from his vacation in Maine.

James G. Heaslet, chief engineer of the Studebaker Corporation, has been placed in general supervision of all Studebaker automobile manufacturing.

R. W. Lytle, formerly with the Velie Motor Vehicle Company, and Lycoming Foundry & Machine Company, has been made factory manager of the Hazard Motor Manufacturing Company, Rochester, N. Y.

C. T. Schaefer has recently associated himself with the Mogul Motor Truck Company, of Chicago, Ill., as chief engineer, and will soon bring out a new two-ton truck, incorporating some new truck improvements.

C. A. Hamilton, who recently resigned from the Lavigne Gear Company, of Racine, Wis., has been elected president of the Racine Manufacturuing Company, the well known body builders of Racine, Wis., succeeding Frank K. Bull.

Frank Lamb, formerly of Bowling Green, O., has resigned his position with the Gramm Motor Truck Company, Lima, to become president and general manager of the newly incorporated National Truck and Manufacturing Company, capitalized at $250,000. The company's plant will be located at Gibsonburg.

George H. Kelly, formerly manager of the truck department of the Baker Motor Vehicle Company, Cleveland, O., has been promoted to the office of secretary and sales director. R. C. Norton, heretofore secretary and treasurer, will continue as treasurer. E. J. Bartlett becomes sales manager of the truck department, and O. B. Henderson will continue as sales manager of the pleasure car department.

G. Earle Porter, formerly with the Motorwagon Company, of Detroit, is now factory manager of the Admiral Motor Car Company, of St. Louis. This company has been successful in manufacturing a one-ton truck listing at $1350. The experimental work has just been completed and the company is in receipt of an order for two hundred and fifty trucks from the Commercial Motors Company, of Chicago.

WILLIAM G. BEE NOW VICE PRESIDENT

Wm. G. Bee, who has been connected with the Edison Storage Battery Company for many years in the capacity of sales manager, has been elected vice president and general sales manager of the company. Mr. Bee has been connected with the electric vehicle industry from the beginning, having been with the Pope Manufacturing Company, and the Electrical Vehicle Company as early as 1897. After serving in the Spanish-American War Mr. Bee returned to the Pope Company, representing them in Mexico, and at the Pan-American Exposition. He is widely known in the electric vehicle field, as well as in the automobile trade generally, and his friends will no doubt be very much pleased to learn of his recent advancement.

Trade Changes and Factory News

Day Utility Car Company, Detroit, Mich., has arranged to move its plant to Spokane, Wash.

Light Commercial Car Company, Marietta, Pa., has moved its headquarters to 1790 Broadway, New York City.

Southern Motor Company, manufacturer of auto trucks, is erecting new plant on Laurel Street, Texarkana, Ark.

Old Reliable Motor Truck Company expects to be in its new factory at 3921 Michigan Avenue, Chicago, Ill., after October 1st.

Four-Wheel Drive Automobile Company, of Clintonville, Wis., has completed its new building and extensions, and has increased its output to 15 cars per month.

Sternberg Manufacturing Company, Milwaukee, Wis., is building an addition to the plant, which is to be completed by October 1st, that will double the output of the company.

Hazard Motor Manufacturing Company, Rochester, N. Y., is building an addition to its plant 60 x 130 ft., which will increase the output of the Hazard engines to over 5000 a year.

Mercury Manufacturing Company, Chicago, Ill., has completed the erection of a new three-story brick and concrete building, and plans to very much enlarge its output for the coming year.

Davis Manufacturing Company, Milwaukee, Wis., has purchased a seven acre tract at West Allis, Wis., on which it will build an immense new plant to take care of its rapidly increasing business.

Zenith Carburetor Company, Detroit, Mich., has leased the old plant formerly occupied by the Armstrong Woolen Company on Vanda Avenue, where they will have very largely increased facilities.

Reliance Truck Company's plant, at Owosso, Mich., according to officials of the General Motors Company, is too valuable to stand idle and it will be occupied by a branch factory. The Reliance plant was recently removed to Pontiac.

Pacific Metal Products Company and the Moore Truck Company, both of Torrence, Cal., recently effected a merger and are building a new and enlarged plant at Torrence. The capital stock of the merger concern was raised to $1,500,000.

Lord Baltimore Motor Truck Company was expected to locate in Frederick, Md. The company announced that unless Frederick citizens invested $35,000 or $50,000 the factory would not be located there. They do not seem to have done so, for the plant will be located at Canton, near Baltimore.

Emil Grossman Company, manufacturers of Red Head Spark Plugs and other accessories, has changed its name to the Emil Grossman Manufacturing Company, inasmuch as it has become almost entirely a manufacturing concern. There has been no changes in the personnel and capitalization of the company.

DeKalb Wagon Company, DeKalb, Ill., which has been manufacturing the "Randolph" commercial cars, will change the name of the car to the "DeKalb," and a new directorate has been elected, consisting of S. M. Hunt, E. S. Hunt, R. D. Hunt, C. E. Bradt, A. G. Kennedy, A. W. Fisk and P. N. Joslin.

Mais Motor Truck Company, of Indianapolis, Ind., may move from that city to Columbus, Ind., provided the negotiations of a group of business men for the acquirement of the business are successful. M. O. Reeves, who is conducting the negotiations for the Columbus group, intimates that if his associates are successful in getting control of the business they will move the plant to Columbus and institute an aggressive selling policy.

New Incorporations and New Models

L. Artana & Sons, San Jose, Cal., are starting in the manufacture of commercial cars.

Atlantic Vehicle Company, New York City, has added to its line of electric commercial cars a 1000 lb. delivery car.

S. G. Gay Campany, Ottowa, Ill., has commenced the manufacture of a 1500 lb. commercial car of European design.

Beaver State Motor Company may decide to establish its plant in Milwaukee, Wis. Auto trucks, etc., are to be manufacted.

Johnstown Motor Car Company, Johnstown, Pa., was recently organized to build commercial motor cars designed by R. R. Herchelroth.

Great Western Automobile Company, Peru, Ind., it is stated, will manufacture a commercial motor car designed by Cecil Taylor, of Detroit, Mich.

Economycar Company has been organized at Indianapolis, Ind., to manufacture a small light delivery car to sell at $450, capable of carrying 250 lbs.

Lewis Motor Truck Company, of San Francisco, Cal., has been reorganized, and the capital stock has been increased to $1,000,000. C. B. Lewis remains president.

P. H. Gill & Sons Company, Brooklyn, N. Y., well known manufacturers of drop forged parts, it is stated, will bring out a commercial motor car of its own design.

Stegeman Motor Car Company, Milwaukee, Wis., has added to its line especially constructed one and two ton motor trucks, particularly adapted to country roads.

Star-Tribune Motor Sales Company, Detroit, Mich., is bringing out the "O. K." 1200 lb. delivery car, which has shaft drive and center control with the motor forward under the hood.

Parish-Ferrell Manufacturing Company has been incorporated with $50,000 capital at Harrisburg, Pa., for the manufacture of commercial cars, by F. C. Ferrell, C. L. Parish and J. J. Parish.

Internal Gear Drive Company, Detroit, Mich., will manufacture a new delivery wagon designed by Albert F. Mais, which will have a carrying capacity of 750 lbs., will weigh 750 lbs. and will sell for $750.

S. & F. Auto Company, Camden, N. J., has been incorporated to deal in new and second-hand automobiles and trucks, with a capital of $25,000. The incorporators are: Agnes Sattler, Geo. F. Sattler and Robert Hughes.

Kugel Auto Company, Indianapolis, Ind., is about to commence the production of commercial motor cars of the same design as the Auglaize, which has been manufactured in New Bremen, O. A new building 80 x 175 ft. will be erected for the purpose of building the trucks, which will be known as the Kugel truck.

Aetna Motor Truck Company, 840 Trumbull Avenue, Detroit, Mich., has just been formed for the purpose of manufacturing a 1½-ton truck, with a 25 per cent. guaranteed overload. The motor used will be a Hazard; Brown-Lipe transmission; Ross steering gear; Sheldon axles and springs, and Brown worm drive.

CHANGES IN WESTERN ELECTRIC ORGANIZATION

A. R. Loughborough, formerly city Sales Manager at the San Francisco office of the Western Electric Company, has been appointed manager of the Salt Lake City sales force, to succeed M. S. Orrick, who became manager at San Francisco.

MARTIN TRACTOR COMPANY REORGANIZES

The Martin Tractor Company, of Springfield, Mass., recently bought the Martin Tractor Company, of Indianapolis, Ind. The capital stock of the new company is $350,000. Harry G. Fisk is president; C. H. Martin, vice-president; C. E. Beckwith, secretary and E. O. Sutton, treasurer. S. E. Eveland, Philadelphia, Pa., is one of the largest stockholders. The plan of the company is to offer nothing new for a year or more, but build a dozen or more tractors and test them out thoroughly before marketing.

Motz Clincher Tire & Rubber Company has established a new agency in Philadelphia, with the Hall Rubber Company, 1402 Ridge Avenue.

The Lee Tire & Rubber Company, Conshohocken, Pa., has established an agency at Newark, N. J., with the Lee Tire Sales Company, 282 Halsey St., and at Brooklyn, N. Y., with the Lee Tire & Rubber Company, 1491 Bedford Avenue.

Pittsburgh Machine Tool Company, Braddock, Pa., manufacturer of Curtis commercial cars, has established the Curtis Motor Sales Company, at Broadway & 57th Street, N. Y. City, in charge of R. W. Friday, C. H. Succop and H. J. W. Foster.

NEW AUTOMOBILE LINES IN SPAIN

A public twice-a-day automobile service was inaugurated on July 19, between Jerez de la Frontera and Arcos, a town of some 10,000 inhabitants, also in Cadiz Province.

Since its foundation many centuries ago Arcos has sat isolated upon a rocky eminence at whose foot runs the Guadalete River. Railways have not approached its limits, and communication with the outer world has been confined to rough highways, over which in modern times uncomfortable horse-drawn coaches have borne passengers by tedious stages to neighboring cities. The journey of eighteen and one-half miles to Jerez under old conditions required four or five hours; by the up-to-date method now installed the distance is traversed in one and one-half hours. The present service is operated by two residents of Jerez, who about three years ago established, and have maintained with much success, a line of public motors between San Fernando and Algeciras, and the type of car used on that run and found satisfactory has been placed on the new route. The chassis was constructed in the works of the Hispano-Suiza Company, the body being built in the neighboring town of San Fernando. Engines of 40 h. p. drive the machinery. The car is large and roomy, well upholstered, and comfortable, with seats for 15 passengers. Fares are $1.08 for the berlina or box and $.80 for the interoir seats. Mails and parcels are also carried.

USE OF ROAD MOTOR CARS BY RAILWAYS

The American consul at Birmingham, England, has sent in the following report:

"The British general post office has shown much enterprise in employing motor vehicles for the transfer of parcels and other mail matter between large cities, and the tendency is to use motor vehicles for carrying freight between different cities and for delivery purposes in the suburbs of large cities, for which work the railways were formerly used. This has apparently been somewhat to the disadvantage of the railways, but the latter have not been backward in using motor vehicles in connection with their services.

In the United Kingdom it is customary for the railways both to call for freight and to deliver it to the door of the consignee. Prior to the development of the motor vehicle railways called for and delivered merchandise and freight with horse-drawn vehicles, but within the past few years they have substituted gasoline-driven commercial motor cars for this purpose to a very large degree.

This is one important feature, but of nearly equal importance is the tendency of great railways to bid for passenger traffic in parts of the country which their lines do not reach, by means of a road-motor service. Foremost among the railways thus utilizing motor vehicles is the Great Western, which has some 33 distinct motor passenger services, including a number in the Midlands, notably in Staffordshire, where there are two services; in Gloucestershire; and the part of Wales nearest this consulate. At the same time motor omnibuses are used all along the line where they have been found profitable, notably in Cornwall, Devonshire, and the vicinity of London. Earlier services have been in use for some four years or more, and the fact that they have been increased is evidence that they have been found financially successful."

Conventions of Interest to the Trade

The list of conventions given herewith is published each month so that commercial car manufacturers can communicate with the proper authorities with the idea of arranging to give lectures, illustrated talks, statistics, etc., to show the advantage of motor trucks in these various lines; also possibly to show and demonstrate their cars.

National

September 17-18—at Hotel Stafford, Cleveland, O. National Paving Manufacturers' Association. W. P. Blair, Secretary, 824 B. of L. Engineers Bldg., Cleveland, O.

September 17-19—at Burlington, Vt. Annual Convention of the New England Section of the National Electric Light Association, to be held at Hotel Vermont.

September 17-24—at Chicago, International Congress of Refrigeration and American Association of Refrigeration; J. F. Nickerson, Secretary, 431 South Dearborn St., Chicago, Ill.

September 22-23—at Hotel Sherman, Chicago, Ill. National Poultry, Butter and Egg Association; Secretary, Chas. E. McNiell, 71 S. Water St., Chicago, Ill.

September 22-24—at Chicago, Ill. American Meat Packers' Association; Geo. L. McCarthy, Secretary, care of *The National Provisioner*, New York.

September 22-26—at Pittsburgh, Pa. Illuminating Engineering Society; Chairman, C. A. Littlefield, 55 Duane St., New York.

September 29-October 4—at Detroit, Mich. Third Annual American Roads Congress; F. Ed. Spooner, Secretary Publicity Committee.

September 30-October 1-2—at Hotel Radisson, Minneapolis, Minn. National Paint, Oil & Varnish Association. F. P. Cheesman, Secretary, 100 William St., New York City.

October 1-2—at Hotel Chalfonte, Atlantic City, N. J. National Association of Cotton Manufacturers. C. J. H. Woodbury, Secretary, 45 Milk St., Boston, Mass.

October 1-3—at Toledo, O. Vegetable Growers' Association of America; Secretary, E. A. Dunbar, Ashtabula, O.

October 2-4—at Atlantic City, N. J. (Hotel Shelburne). United States Brewers' Association; H. F. Fox, Secretary, 109-111 E. 15th St., New York City.

October 8-10—at Milwaukee, Wis. The National Funeral Directors' Association Convention.

October 13-17—at St. Louis, Mo. Carriage Builders' National Association; H. C. McLear, Secretary, Mt. Vernon, N. Y.

October 14-16—at New Orleans, La. Grain Dealers' National Association.

October 14-17—at Chicago. American Institute of Metals; Secretary, W. M. Corse. Lumen Bearing Co., Buffalo, N. Y.

October 14-17—at Buffalo, N. Y. Convention of the American Foundrymen's Association.

October 15-17—at Richmond, Va. American Gas Institute; Geo. G. Ramsdell, Secretary, 29 W. 39th St., New York City.

October 20-24—at Philadelphia, Pa. The Annual Convention of American Mining Congress. David W. Brunton, of Denver, Col., is president of the Association.

October 21-25—at New Orleans, La. International Association of Electrotypers; R. J. Wilhelm, Secretary, 64 South Division St., New York City.

October 21-25—at New Orleans, La. United Typothetae of America; F. W. Heath, Secretary, 1650 Transportation Bldg., Chicago, Ill.

October 22—at Tulsa, Okla. International Dry Farming Congress.

October 24—at Chicago, Ill., American Iron & Steel Institute; James T. McCleary, Secretary, 30 Church St., New York City.

October 29-31—at Chicago, Ill. National Creamery Buttermakers' Association; S. B. Shilling, 136 W. Lake St., Chicago, Secretary.

October 29-31—at Hotel Marlboro-Blenheim, Atlantic City, N. J. National Hardware Association of U. S.; Secretary, J. T. Fernley, 505 Arch St., Philadelphia.

October 31-November 4—at New York (Museum of Natural History), National Association of Gardeners. M. C. Ebel, Madison, N. J.

November—at Cincinnati, O. The Convention of the National Coffee Roasters' Association; G. W. Toms, Secretary, Dayton, O.

November 4-7—Grunewald Hotel, New Orleans, La. Laundrymen's National Association of America; Secretary, W. E. Fitch, 425 1st St., LaSalle, Ill.

November 11—at No. 11 Broadway, New York. American Society of Engineering Contractors; Secretary, J. R. Wemlinger.

November 18-20—at Louisville, Ky. Maintenance of Way, Master Painters' Association; Secretary, Wm. G. Wilson, 149 Beacon St., Middletown, N. Y.

December 1-6—at Philadelphia, Pa. National Commercial Gas Association. Secretary, Louis Stotz, 29 W. 39th St., New York City.

December 3—at Chicago, Ill. National Association of Furniture Manufacturers. Secretary, J. S. Linton, Ashton Building, Grand Rapids, Mich.

January 14—at Hotel Astor, New York City. National Boot and Shoe Manufacturers' Association. Sol Weil, Secretary, Rochester, N. Y.

February 10-24—at Dallas, Tex. National Corn Exposition.

Fire Associations

September 15-20—at Kansas City, Kan. State Firemen's Association.

September 16-19—at White River Junction, Vt. Annual Convention and Tournament of Vermont State Firemen's Association at Vermont State Fair Grounds.

September 17-18—at Atlantic City, N. J. State Firemen's Relief Association will convene.

September 24-26—at New Bedford, Mass. Massachusetts State Firemen's Association. D. Arthur Burt, Secretary, Taunton, Mass.

October 13-18—at Philadelphia, Pa. National Fire Prevention Conference; Powell Evans, Chairman, Room 420, City Hall, Philadelphia.

State Conventions and Fairs

September 15-20—at Millville, N. J. Second Annual Cumberland County Fair and Poultry Show at Lake Park.

September 15-20—at Boston, Mass. Annual Convention of the American Association of Public Accountants. The Copley-Plaza is to be the headquarters of the convention.

September 16-18—at West Alexander, Pa. West Alexander Fair. John M. Gibson, Secretary.

September 16-18—at Roseau, Minn. Roseau County Fair. Israel Sjoberg, President.

September 16-18—at Rockville, Conn. Rockville Fair Association will hold Annual Fair. A. Burke, manager.

September 16-18—at Gorham, Me. Cumberland County Agricultural and Horticultural Society will hold Fair.

September 16-18—at Manchester Centre, Vt. Battenkill Valley Fair.

September 16-19—at White River Junction, Vt. Vermont State Fair. F. L. Davis, Secretary.

September 16-19—at Cresham, Ore. The Multnomah County Fair.

September 16-19—at Petroskey, Mich. Emmet County's Annual Fair. F. A. Jackson, Harbor Springs, Mich., Treasurer.

September 16-19—at Inwood, W. Va. The Inwood Fair Association will hold Fair. Sewell Cunningham, Secretary, Martinsburg, W. Va.

September 16-19—at Nazareth, Pa. Northampton County Agricultural Society will hold Fair.

September 16-19—at Ottawa, Kan. Franklin County Agricultural Society will hold fair. R. J. Finley is Secretary.

September 17-19—at McAlester, Okla. Pittsburgh County Fair.

September 17-19—at Two Harbors, Minn. The Seventh Annual Lake County Fair. W. B. Woodward, Secretary.

September 18-20—at Newark, N. Y. Annual Fair of the Newark Fair Association.

September 22-23—at Chicago, Ill. Sherman Hotel. Secretary, Chas. E. McNeill, 71 W. S. Water St. Chicago, Ill.

September 22-24—at New York City. The Second Co-Operative Safety Congress is to be held under the auspices of the Association of Iron and Steel Electrical Engineers, at the Hotel McAlpin.

September 22-25—at San Marcos, Tex. Hays County Fair Association will hold County Fair.

September 22-26—at Pittsburgh, Pa. Illuminating Engineering Society. Chairman, C. A. Littlefield, 55 Duane St., New York City.

September 22-27—at St. Joseph, Mo. Fair under auspices of the St. Joseph Interstate Fair Association. Headquarters at 5th and Francis Sts. W. W. Cole, Secretary.

September 22-27—at Boise, Idaho. The Idaho Intermountain Fair Association will hold fair at the Association's grounds. William Krull, Secretary, 297 McCarty Bldg., Boise, Idaho.

September 22-27—at Memphis, Tenn. Tri-State Fair Association will hold Fair. Frank Fuller, Secretary.

September 23-25—at Mercer, Pa. Annual Fair. Mercer Fair Association.

September 23-25—at Deadwood, S. D. Fall River County Fair. Marcus Jacobs, Treasurer.

September 23-25—at Raleigh, N. C. The Wilkes County Fair Association will hold Annual Fair.

September 23-25—at Brooklyn, Conn. Wingham County Fair Association will hold fair. J. B. Stetson, Secretary and Treasurer.

September 23-25—at Logan, Utah. Cache County Fair.

September 23-26—at Rochester, N. H. Rochester Agricultural and Mechanical Association will hold Fair.

September 23-26—at Minneapolis, Kan. Ottawa County Fair Association will hold Fair. J. E. Johnson, Secretary.

September 23-26—at Leoma, Tenn. The Third Annual Lawrence County Fair. A. H. Freeman, President.

September 23-26—at Parkersburg, W. Va. West Virginia Fair, to be held at Shattuck Park.

September 23-26—at Bath, N. Y. Steuben County Fair Association will hold Fair. Chas. A. Shults, Secretary.

September 23-26—at Coffeyville, Kan. Montgomery County Fair Association will hold Fair.

September 23-26—at Roanoke, Va. Great Roanoke Fair. Louis Scholtz, Secretary.

September 23-27—at Mineola, N. Y. Agricultural Society of Queen's and Nassau Counties will hold fair. Thos. H. Bacon, Secretary.

September 23-27—at Hope, Ark. Hempstead County Union Fair. R. H. Ethridge, Business Manager.

September 23-October 4—at Oklahoma City, Okla. Seventh Annual State Fair and Exposition; J. S. Mahan, Secretary.

September 24-25—at Waterville, Me. Convention of the Maine State Board of Trade.

September 24-26—at Riverside, Wash. Okanagon County Fair. W. H. Patterson, Secretary and Treasurer.

September 24-27—at Mt. Kisco, N. Y. West Chester County Agricultural and Horticultural Society, Inc., will hold Fair.

September 25-27—at Palmyra, N. Y. Annual Fair of Palmyra Agricultural Society.

September 25-27 and October 2-4—at Holyoke, Mass. Third Annual Fair of the South Holyoke Lyceum, to be held in City Hall. T. J. Doherty, Chairman.

September 25-27—at Eaton, Ind. Seventh Annual Agricultural and Livestock Fair. H. C. Morris, President.

September 27-October 3—at Sedalia, Mo. Missouri State Fair; John P. Stinson, Secretary of Fair Associaion.

September 29-October 3—at Poughkeepsie, N. Y. Dutchess County Fair at the Driving Park.

September 29-October 3—at Trenton, N. J. Inter-State Fair.

September 30-October 2—at Larned, Kan. Pawnee County Agricultural Association will hold Fair; T. C. Wilson, Secretary.

September 30-October 2—at Fredericksburg, Va., 1913 Fair. Rappahannock Valley A. and M. Society; S. B. Quinn, Secretary and Treasurer.

September 30-October 3—at Lancaster, Pa. Lancaster County Fair. Jacob F. Seldomridge, Secretary.

October—Dallas, Texas. Retail Marble and Granite Dealers will convene. A. G. Deatheridge, of Wichita Falls, Texas, is President.

October—at Amarillo, Tex. Panhandle State Fair.

October—at Amherst, Mass. Eastern Hampden Agricultural Society will hold Fair at the Massachusetts Agricultural College.

October—at Yreka, Siskiyou County, Cal. The Siskiyou County Agricultural Society will hold Fair.

October 1-3—at Toledo, O. Annual convention of the Vegetable Growers' Association of America. E. A. Dunbar, Secretary, Ashtabula, O.

October 1-3—at Fredericksburg, Tex. Gillespie County Fair.

October 1-3—at Eureka, Mont. Lincoln County Fair.

October 1-4—at Ava, Mo. Douglas County Fair Association will hold Fair. Frank J. Davis, Secretary.

October 1-4—at Douglas, Kan. The Douglas Agricultural Society will hold its Ninth Annual Fair. J. A. Clay, Secretary.

October 1-4—at Newport, Wash. Pend Oreille County Fair.

October 3-11—at Springfield, Ill. Illinois State Fair, under the auspices of the Illinois State Board of Agriculture. J. T. Montgomery, President, Charleston, Ill.

October 4-11—at Denver, Col. Electrical and Industrial Exposition, by the Colorado Electrical Club; L. M. Cargo, 1052 Gas & Electric Bldg., is Chairman of Committee.

October 6-10—at York, Pa. York County Agricultural Society will hold Exhibit.

October 7-9—at Bowbells, N. D. County Fair.

October 7-9—at Brenham, Tex. Washington County Fair Association will hold Annual Fair; C. A. DeWare is President, and F. H. Dever is Secretary.

October 7-10—at Greenwood, Ark. Greenwood Agricultural Show; Jesse A. Bell, Chairman of Finance Committee.

October 7-11—at St. Marys, Pa. Elk County Farmers' Agricultural Fair Association will hold fair at new fair grounds.

October 7-11—at Arlington, Cal. Riverside County Agricultural Fair to be held at Chemawa Park. O. P. Sanders, Secretary.
October 8-11—at Nacogdoches, Tex. Fair and Poultry Show. Ed. L. Rice, Secretary.
October 8-18—at Wichita, Kan. Third Annual Wichita Fair and Exposition, to be held in the Forum; Walter P. Innes, Manager.
October 9-11—at Oakland, Md. The Agricultural Association of Garrett County will hold Fair.
October 13-16—at Tuscon, Ariz. Graham County Fair. W. B. Fonda, Secretary, Safford, Ariz.
October 13-18—at Waterloo, Iowa. Waterloo Dairy Show. Address W. B. Barney, State Dairy and Food Commissioner.
October 13-10—at Chicago, Ill. American Foundrymen's Association will hold convention at La Salle Hotel.
October 14-16—at Stoughton, Mass., County Fair.
October 14-17—at Davenport, Wash. Lincoln County Fair. A. J. Thomas, manager.
October 15—at Pendleton, S. C. The Pendleton Fair Association will hold Fair. Dr. W. W. Watkins, Chairman.
October 18-23—at Gilbertown, Ala. The Choctaw County Farm Demonstration and Fair Association will hold Annual Fair.
October 21-23—at Meridian, Miss. State Convention of Farmers' Union of Miss. R. A. N. Wilson, Chairman.
October 21-23—at Chester, S. C. The Chester County Fair Association will hold Fair. G. J. Patterson, Secretary.
October 21-24—at Wichita, Kan. Business Men's Association preparing for Trans-Mississippi Congress, to be held in Wichita.
October 21-31—at Macon, Ga. Georgia State Fair; M. V. Calvin, Secretary.
October 22-24—at Harrisonburg, Va. Rockingham County Fair Association will hold Fair at Lake Park.
October 22-November 1—at Tulsa, Okla. Eighth Annual Session of Congress & International Soil Produce Exposition.
October 27-31—at Columbia, S. C. South Carolina Agricultural and Mechanical Society will hold Fair at University of S. C.
October 27-November 1—at Tuscaloosa, Ala. West Alabama Fair Association will hold Fair.
October 28-31—at New Bern, N. C. Eastern Carolina Fair. J. Leon Williams, Secretary.
October 28-November 1—at El Campo, Tex. El Campo Agricultural Fair Association will hold Annual Fair. H. D. Brown, Secretary.
November—at Shreveport, La. State Fair.
November—at Columbus, Ga. Board of Trade will hold Fair.
November—at Orangeburg, N. C. Orangeburg County Fair. J. M. Hughes, Secretary.
November 3-8—at Dublin, Ga. Twelfth District Fair Association will hold Fair. P. S. Tweitty, Manager.
November 4-7—at Walterboro, S. C. Colleton County Fair Association will hold Annual Fair. R. M. Jefferies, Secretary and Treasurer.
November 7-14—at Augusta, Ga. Poultry Show and Fair under the auspices of the Augusta Poultry Association and Georgia-Carolina Association.
November 11-12—at Fort Worth, Tex. Annual Convention of the Texas Commercial Secretaries' and Business Men's Association.
November 15-22—at Beaumont, Tex. Southeast Texas Fair.
November 17-22—at Columbus, Ga. Columbus Poultry Association will hold exhibition. John S. Jenkins, Secretary.
November 18-20—at Louisville, Ky. Maintenance of Way, Master Painters' Association. Wm. C. Wilson, Secretary, 149 Beacon St., Middletown, N. Y.
November 26-28—at Darlington, S. C. The Eastern Carolina Poultry Association will hold Poultry Show.
December—at La Crosse, Wis. La Crosse Wisconsin and Pet Stock Association will hold annual show.
December 9-12—at Philadelphia, Pa. Tenth Annual Convention of American Road Builders' Association, to be held at First Regiment Armory Building. E. L. Powers, 150 Nassau St., New York City, Secretary.
December 9-13—at Harrisburg, Pa. Central Pennsylvania Poultry Association will hold exhibition; C. S. Smith, of West Fairview, is Show Superintendent.
December 10-12—at Milwaukee, Wis. Wisconsin Retail Implement and Vehicle Dealers' Association; G. F. Borchardt, South Milwaukee, Wis., President.
December 11-12—at Georgetown, Del. Delaware Corn Growers' Association will hold show.
December 11-20—at New York City. First International Exposition of Safety and Sanitation, under auspices of the American Museum of Safety, 29 W. 39th St., New York City.
January 20-22, 1914—at San Antonio, Tex. Annual Convention of the Texas Hardware and Implement Association.
February 9-14—at Baltimore. Retail Hardware Association of Maryland, Pennsylvania, Delaware and New Jersey will hold convention; W. P. Lewis, Huntingdon, Pa., is Secretary.
February 10-13—at Philadelphia, Pa. The Penna. Retail Hardware Dealers' Association will hold exhibition at 3rd Regiment Armory.

Financial and Legal

Schacht Motor Car Company, Cincinnati, O., under the receivership of John F. Dietz, has declared a dividend of 20 per cent. to the stockholders.

Ewing Motor Truck Company, Findlay, O., was recently sold by the receivers to Mr. Ewing, who is making arrangements for the reorganization of the business.

Motor Wagon Company of Detroit, Detroit, Mich., L. E. Joslyn, referee in bankruptcy, has ordered the sale of the assets of the company, consisting of chasses and parts, machinery and factory equipment, etc., appraised at $40,000, and the sale took place on September 3 on the premises, 1379 St. Antoine Street, Detroit.

Lansden Company, of Newark, N. J., and Allentown, Pa., receiver H. L. Davisson, has filed a schedule showing assets of $304,000 and liabilities of $193,000. To take care of many orders in hand the receiver is moving the plant back to Newark, N. J., where it will be managed by John B. Wickery, the former sales manager of the company.

Grand Rapids Motor Truck Company, Grand Rapids, Mich., assets of the company were sold by order of court to F. T. Hulswit for $17,000. It is probable that the consolidation of the Grand Rapids Motor Truck Company, with the Michigan Hearse & Carriage Company, which had been in contemplation, will now be effected by Mr. Hulswit, the new purchaser.

EMBARRASSMENT OF THE SANDUSKY AUTO PARTS AND MOTOR TRUCK COMPANY

Owing to the failure of the Michigan Buggy Company, for whom it had manufactured a large number of motors, the Sandusky Auto Parts and Motor Truck Company, of Sandusky, O., has been placed in the hands of Daniel E. Storms and Wm. H. Marsh, as receivers, and the Union Savings Bank & Trust Company of Cincinnati as trustees for the holders of $150,000 worth of first mortgage bonds. The plant will be operated under the receivers, and Daniel E. Storms, formerly general manager of the plant, will have charge of the sales, etc. Wm. H. Marsh is to have charge of the management of the plant, and purchase of materials, etc. The receivership was precipitated by the starting of a number of suits on accounts and promissory notes. The company has a capital stock of $500,000, of which $314,000 was paid in. It had also issued first mortgage bonds to the amount of $150,000. The failure of the Michigan Buggy Company ties up property and cash worth approximately $150,000. As the company has the backing of a number of influential citizens of Sandusky, it is expected that a reorganization will be effected.

KOEHLER "PLUMBERS' AND CONTRACTORS' JOB" SUCCESSFUL

The truck here illustrated is the "Plumbers' and Contractors' Job," a one-ton truck of the H. J. Koehler S. G. Company, of 1709 Broadway, New York. This car is fitted with pipe racks and an open flareboard body, 9 ft. back of the driver's seat. This truck is owned and operated by the F. & W. V. Engelberger Company, Newark, N. J., and has been, according to Engelberger's own words, "in daily use since receiving it from the factory in April, and we are entirely satisfied with the results obtained and the car has more than met our expectations, especially so as we have given it severe tests. It is most gratifying to us to find that the car is all that it was represented to be."

The car averages 50 to 60 miles per day, and is used to carry plumbing materials and workmen. There are no particular number of trips the car makes per day, but it is kept busy from job to job hauling material. The truck not only is a saving over horse-drawn methods formerly employed, but accomplishes several times the amount of work, and it is in lieu of the amount of work the truck accomplishes per day that, regardless of its operating cost, its use would now be indispensable.

Koehler "Plumbers' and Contractors' Job"
This is a one-ton truck, which has proven successful in the plumbing business

THE COMMERCIAL CAR JOURNAL

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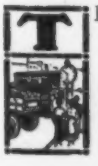
ALCO WITHDRAWAL NOT A REFLECTION ON THE COMMERCIAL CAR INDUSTRY



THE abrupt and unusual action of the American Locomotive Company in suddenly discontinuing the manufacture and sale of commercial cars has caused considerable comment and discussion among the trade. The company in question undoubtedly has good and sufficient reasons for its sudden withdrawal from the industry, and its action in protecting its users for a period of five years is most honorable and commendable. Lest this summary withdrawal be attributed to existing trade conditions, we wish to point out the real cause of this action on the part of one of the largest and best known American makers.

Those who are best informed concerning the production methods of the Alco Company as far as commercial cars are concerned, believe that there was not the most harmonious feeling between the various branches of the company, namely those devoted to the manufacture of railroad rolling stock and those producing motor cars. There was evidently the feeling on the part of certain stockholders and officials who were not closely in touch with the automobile industry, that the well known policies and practices of this well established concern, which had led to such eminent success in the manufacture of locomotives, would also bring about the same results in the automobile business.

The two branches of the business were carried on together to an extent which was very detrimental to the automobile end of the business. There was no separate and individual automobile company, capable of carrying on its own particular line of manufacture to the best advantage without supervision and interference from men higher up who were not closely associated and in harmony with commercial car manufacturing interests. The early history shows radical and sudden changes of design, blue prints superseding blue prints, system within system, and a small army of men to maintain and keep detailed records of the innumerable changes, alterations, and shifts of policy, in regard to the automobile end of the business.

That this particular branch did not produce money results was well known. For a period of many months the product went through a series of costly changes working towards its ultimate perfection. How nearly this result was reached is shown by the splendid service which all of the recent Alcos have been giving, but disgruntled stockholders, whose sole knowledge of the industry consisted in driving a high powered car over the road, and discussing such performances reclined in a leather bottom arm chair at the club could not realize that a certain amount of this pioneering was necessary before the ledger would show the long-looked for balance, on the proper side.

There were sweeping and sudden shifts of employees, not only the cheaper class, but more particularly among high salaried heads, until the production workers knew not whom to look to the next day for instruction. Friends, relatives and favored ones, often with no other qualities as requisites for the positions, were placed in charge, only to again employ as assistants men who had actually had the necessary experience. Any firm as well established as the one in question, with finances sufficient, can make such wholesale shifts, simply because they have sufficient capital to do so, but such methods can end but one way, whether employed in a large or small company. The Wall Street committee, which finally and without warning brought about the sudden discontinuance of the manufacture of pleasure cars and trucks of this company, were not men with years of experience in the automobile industry behind them, and it is believed by those who are conversant with the affairs of the company that this action came just when the company was on the high road to financial success in this particular branch, the period of experimenting, changing and organization having been passed. There is but the one conclusion: That the discontinuance of motor car manufacture on the part of this concern was not due to any conditions which exist in the automobile industry, but to the fact that the directors of the company were not in close enough touch with either the automobile trade or with the conditions which existed in their own factory.

The truck will produce more work and of a better quality

IS COMMERCIAL CAR MANUFACTURING A PROFITABLE BUSINESS?

SINCE the withdrawal of the American Locomotive Company from the manufacture of commercial motor cars, many have been asking the question, "Can a reasonable profit be made out of the manufacture of motor trucks?"

It is contended by some, that as commercial motor cars have been proven a success, in fact a utility for which there is a crying need, and as the demand for them is active, there should be more evidence that their manufacture is carried on profitably.

It is claimed that the percentage of really successful commercial car makers is not as large as it should be, that too many concerns have gone down in the endeavor to successfully manufacture and market commercial motor cars.

We believe that the manufacture of motor cars is as profitable a business as the manufacture of any other machine. But we question whether the marketing of them is conducted on a profitable basis.

Suppose all the conditions surrounding each concern is on the proper footing, that is—the design of the car built is right, the management of the factory is capable of producing the cars at the lowest manufacturing cost, the company has sufficient capital to carry through the building of the number of cars it has planned to build, the sales department is capable of selling them at a reasonable cost per car, and the selling price secured covers all of the manufacturing and selling cost and a reasonable profit.

Suppose all these things are right, as they have been in some cases where the balance sheet has shown a loss after several years of presumably profitable business. Why should such a concern find itself in financial difficulties?

Of course, when an industry is young the number of concerns which make a wrong start is bound to be greater than is the case after the industry becomes a settled fact.

When a new concern starts to build a new car, everything is against it. If the men haven't had experience in this line, they must acquire it, before they can be successful.

If the car to be built is a modification of an experimental car built by the engineer-organizer, many things are discovered to require changing, after the cars are in the hands of the users.

These changes are costly and bring the manufacturing cost up by leaps and bounds, not only because of the cost of the changes themselves, but because of the delay they cause and cutting down of the entire product for a stated period, while all other expenses are going on uninterruptedly.

These two causes have produced the bulk of the deficits for the first two or three years, in many cases where all conditions were supposed to be right.

But there is a most important factor which enters into the marketing of commercial motor cars which has not been given the attention or consideration that it requires, and that is, "How to assure the purchaser good service without too great expense to the maker or to the buyer."

The successful marketing of any product includes placing the purchaser in a position to get full service and satisfaction, so that he will come back for more and recommend his purchase to others.

It may be possible for a well organized sales department to sell the output of a good commercial car factory for one, or two, or perhaps three years, without paying any particular attention to the service secured by the purchasers, but as time goes on, the number of dissatisfied owners will increase until the entire trade is aware of them, and the car has the universal reputation of being a lemon, and then sales cannot be made even though the sales department spend money lavishly.

The car itself may be right in every respect, but so much depends upon the handling of it, that it is absolutely necessary to consider the best means to secure the proper handling of it in actual service, as a part of the marketing of the product.

We believe that lack of attention to this fact has caused more loss to commercial car manufacturers than any other cause. And many good cars have lost their reputations because incompetent drivers have given them the "black eye."

Every man connected with the manufacture and sale of commercial motor cars admits that the successful operation of a commercial car depends absolutely and entirely on the driver. Most of the purchasers of the cars, and a very large percentage of possible purchasers know that this is the case.

In fact, the greatest single obstacle encountered by the sales department of any commercial car maker or agent, in making a sale to a concern which has not owned motor trucks before, is that they have no one they can trust to drive them. Their old drivers, which are familiar with their business know nothing at all about motor cars; their stable man who takes excellent care of the horses knows nothing at all about the care of motor cars, and to replace these men with a new set of men, if it were possible to get them, would mean to disorganize their whole delivery department.

But the fact is that good commercial car drivers and foremen are very scarce. About a third of the commercial cars now in use are driven by men who do not know how to handle them, and two cars are being built now to every teamster that is turned into a capable commercial car driver.

Is it any wonder that some owners fail to get a satisfactory service? We must admit that in our continual search for information as to the service secured by owners, we often come across those who say that the cars are costing more than the horse-drawn service did, but that they must keep them because their customers have been educated to them, and others who have dropped cars entirely because the driver got them into so much trouble and expense.

These dissatisfied owners tell these things to other business men they come in contact with, and there is no end to the harm that the incompetent driver is doing to the industry.

Many good business men are strongly prejudiced against commercial cars because of the stories which have been told them of these expensive experiences and none of them know the real cause.

A few manufacturers realize these conditions, and are teaching the old drivers, who have been in the employ of the purchaser, to operate the cars. But this practice is not general, and there are many manufacturers who make no attempt at all to increase the number of capable commercial car drivers.

This should be absolutely the first consideration in the marketing of commercial motor cars. Not a single car should be put in service unless the manufacturer knows that it will be in the hands of a competent driver.

Any sales plan that does not take this matter into consideration will fall short of permanent success, if it does not lead to failure.

This question is as important to the commercial car dealer as it is to the manufacturer. The dealer is the first to feel the consequences, if a number of the cars he has sold are in the hands of incompetent drivers. Complaints and troubles come thick and fast and the dealer spends good money to make things right, which could not have occurred had the car been in the hands of a competent driver.

As suggested in a recent issue of the "C. C. J.," the manufacturers and agents should co-operate in the establishment of drivers' schools in every locality, making as light a charge for tuition as possible, and teaching not only the drivers of the concerns who have bought cars, but all drivers who can be induced to learn, even though the firm whom they are working for has no present intention of buying a car.

When such a firm finds that its drivers, in whom it has confidence, fully understand the operation of commercial motor cars, it will very readily become a purchaser.

It is not enough that individual makers or dealers here and there teach a few drivers. This does not supply the demand by any means, and the maker, who has established a school finds that some of the drivers he has taught are induced to drive cars of other makes, leaving his car at the mercy of an incompetent man.

A general school, having both day and night sessions and teaching the operation of any or all makes of cars is the best plan. This is a thing which the commercial car section of the Automobile Chamber of Commerce could plan and organize very readily.

It must be remembered that the chauffeurs who drive pleasure cars cannot be counted upon. They are in a different class. They will not handle the merchandise as the driver of a commercial car is required to do, and they expect much higher pay.

It is our belief that more commercial car manufacturers and dealers have been forced to quit because of the expense of keeping their cars, which have incompetent drivers, in satisfactory service or because of the "Black Eye" given their product by incompetent drivers, than from any other cause.

Would not the selling of commercial cars and keeping them in satisfactory service, or in other words the complete marketing of commercial motor cars be much more easily and surely accomplished if an adequate supply of fully competent drivers was always available?

Would it not be cheaper to educate the drivers in advance, than to spend so much to make sales and so much more to make good the blunders of incompetent drivers? Would chains of expensive service stations be required if every commercial car was in the hands of a competent driver?

One of the largest and most successful manufacturers —one who has for two years or more been making it a rule to teach a driver for every one of its cars—states that the expense of maintaining its service station in a certain city is less now than it was two years ago—notwithstanding the fact that there are five times as many of its cars in daily use now.

Is this not positive proof of the advantage of always having the cars in the hands of competent drivers?

The manufacturers and agents should take a broad-minded view of this urgent need. Cast aside business jealousy. Every one contribute in proportion to the number of cars produced and sold and teach enough drivers to take care of the product in advance of its completion.

Steel and Rubber Markets

Steel Market Steady

The volume of new business continues light, while specifications continue to come in in ample amount to keep the steel companies operating at close to 90 per cent. of total ingot capacity. Quotations on September 9th were:

STEEL PRODUCTS PRICES

Bessemer steel, per ton, mill	25 00 a 26 00
Open hearth, per ton, mill	24 00 a 24 50
Sheet bars, per ton	25 00 a 25 50
Steel bars, soft base, half ex., tidewater	1 56 a .....

The above prices are at tidewater in carloads and larger lots. For quantities less than 2000 lbs., but not under 1000 lbs., $2.00 per ton additional is charged, and less than 1000 lbs., $8.00 per ton additional.

SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots $2.00 per ton higher.

Gauge—	Black.	Galvanized.	Gauge—	Black.	Galvanized.
Nos. 22 & 24	1 95	2 85	No. 28	2 15	3 15
Nos. 25 & 26	2 00	2 95	No. 29	2 20	3 30
No. 27	2 05	3 05	No. 30	2 25	3 50

IRON AND STEEL AT PITTSBURGH

Bessemer iron	16 65 a 16 90
Bessemer steel, f. o. b. Pittsburgh	25 00 a .....
Muck bars	31 00 a 32 00
Skelp, grooved steel	1 45 a 1 50
Skelp, grooved iron	1 70 a 1 75
Ferro-manganese (80 per cent.), seaboard	55 00 a 56 00
Steel, melting scrap	12 50 a 13 00
Steel bars	1 40 a .....
Black sheets, 28-gauge	2 15 a 2 20
Galvanized sheets, 28-gauge	3 15 a 3 20
Blue annealed, 10-gauge	1 65 a 1 70
Tank plates, ¼-in. and heavier	1 40 a 1 45

Crude Rubber Firm

Since our last writing crude rubber has dropped a few points, the market, however, being firm both here and abroad. There is no special activity, however, on either side. Domestic scrap rubber is in moderate demand on the basis of quotations, while foreign scrap is also in fair demand. Quotations on September 9th were:

Up-River—	
Fine	88 a 89
Coarse	51 a 52
Island Fine—	
Coarse	31 a 32
Cameta	39 a 40
Cauche—	
Bal	53 a 54
Centrals—	
Corinto	51 a 52
Esmeralda	50 a 51
Guatemala, slab	45 a ..
Mexican—	
Scrap	53 a ..
Strips and scrap	52 a ..
Guayule	Nominal
Balata, sh't	70 a 71
Ciudad, b'k	49 a 50
Trinidad, B'k	Nominal
Africans—	
Massai, red	64 a ..
Red C'go	Nominal
B'k C'go	64 a ..
Soudan—	
Niggers	Nominal
Accra, lbs.	34 a 35
Gambia, prime	50 a 51
East India—	
Smk. sh'ts	68 a 70
Ceylon, bis and sh'ts	66 a ..
Pale crepe	65 a 66
Borneo I	60 a 62
Borneo II	48 a 49
Borneo III	32 a 33
Pontianac—	
Prime plantation	6 a ..
Palembang	5 a ..

Scrap Rubber

DOMESTIC

Boots and shoes	9¼ a 9¾
Tires—	
Automobile	9½ a 10
Bicycles, pneumatic	5 a 5¼
Wagon and carriage, solid	9 a 9¼

FOREIGN

Foreign cut goloshes	7¼ a ..
Automobile tires, plain	10½ a 10¾
Bicycle tires, with beads	3½ a 4

The Pennsylvania Motor Federation and trade and allied bodies are making every effort to secure the passage of legislation to authorize the State of Pennsylvania to make a loan of $50,000,000 for the improvement of highways. A State Good Roads Convention will be held in Harrisburg, Pa., September 18th, to forward this movement, and there is no doubt but that a very large attendance will be secured.

G. C. VAPORIZER TESTS

The G. C. Vaporizer Company of America, Inc., New York, recently held tests to ascertain the fuel limit of the vaporizer. It found that the vaporizer could gasify any fuel containing power producing elements.

The variety of fuels that were tried was wide, including motor spirit, denatured alcohol, kerosene and a number of mysterious products without any name. There was a turpentine by-product, nameless, with a gravity of .865, and a most "painty" smell. It went through the motor without trouble and left the exhaust minus smoke smell. Then there was a mysterious product, dark and heavy, and much resembling a light lubricating oil, save that it had a rotten-egg odor, indicating a large content of hydrogen sulphide. No one would have accused it of being a fuel for an automobile motor, yet the G. C. proved that it was. The tests with the various unusual substances were made merely by way of showing that the G. C. will take any fuel at all, and in this respect were fully successful.

THIRD ANNUAL AMERICAN ROADS CONGRESS

Nearly one hundred exhibitors have taken the space for the great exhibition which is to be held in conjunction with the Third Annual American Roads Congress in Detroit, to be held September 29 to October 4 inclusive. This exhibition will be the most important ever held in the history of road making in America and is in line with the movement to make the American Road Congress an annual training school for road and street officials and to enable these gentlemen to increase their efficiency through the exhibition of material and equipment and also through lectures given by leading specialists. Every known road material will be shown and the Government exhibits will illustrate the exact methods of constructing every recognized type of road. The exhibit will in reality be a gathering place for all men who are actually directing the building, maintenance and administration of streets and highways. These gentlemen will become personally acquainted and will gain greatly through the exhibit and the discussions which are certain to arise over the various machinery and materials to be shown. Devices for road building, the methods of road building and materials will be freely discussed and knowledge will be obtained at this exhibition in a short space of time that could not be secured otherwise.

REGULAR MEETING OF THE E. V. A.

The regular monthly meeting of the Electric Vehicle Association of America will be held in the Edison Auditorium, 44 West 27th Street, New York City, on Tuesday, September 23rd, at 8 P. M. "The Value of Power Wagon Operation to the Community" is the title of the paper to be presented by F. J. Ryan.

SOME LETTER

The letter which we herewith reproduce was written us in answer to our inquiry for data from which to make up our monthly cartoon of sales managers. Each month we show some of the prominent sales managers, and it has been our custom to write to the companies in a jocular vein, asking that some enemy of the sales manager kindly supply us information so that we can properly cartoon the particular sales manager in question.

Commercial Car Journal, Philadelphia, Pa.
Attention Mr. C. A. Musselman,

Dear Sir: If I had my way about this sales manager of ours, namely Mr. ————, I would have his picture sent to all the policemen in the country. They ought to know about him. A lot of them are nervous wrecks because they don't know whether they are seeing things or not. It is just a question of "Here he comes" and then "There he goes," and he passes some so fast that they wonder what it is. There is no doubt that this thing they call the Automobile is the Devil's idea. But the idea of speed, that's his own idea, and he sure has some ideas. It certainly is a good thing he belongs to a tire company or otherwise he would be walking today or either driving about eight miles an hour, because he can go through a set of tires in no time.

He covers about six hundred miles a week. He holds the record from Boston to Portland, Maine, and darn it all, that isn't the worst of it. He is actually proud of it. One of his favorite tricks is to go to the factory in his car, while we are trying to make phone connections. This is an eighteen mile run and he has frequently made this trip in less than nothing.

Did you ever have a fellow tell you a funny story and then do all the laughing himself? Well, this is just what he does, and it makes me sore. Not that I don't like humor, but such uncanny stories you never heard. Where is there any humor in a fellow traveling about sixty-five miles an hour and all the time telling you something funny that happened the day before when he was going seventy? Every time I go for a ride with this daredevil I leave money enough with the family to last them for several months and also tell them where to go to collect the life insurance, which is coming to me when I cash in. This fellow is built for speed and endurance and he cares darn little for comfort.

He is also some art critic. His favorite painting is "September Morn." He nearly ran over a man yesterday. He was driving along and he spotted one of these new Shadow Skirts. I'll bet this was the first slow driving he has done in a long time and he had to go slow to keep on the road, for Lord knows he wasn't watching where he was going.

His favorite author is the man who signs the orders. He can go in any town in the country and get the greatest author in town and get his autograph on a nice big fat order. He sure is a handy man to have around a concern. He has all the bad habits an automobile man is supposed to have, being a very fluent cusser, and all the time smoking a big fat torch. Stays out late at night. Gee, I don't know anything good about him. Oh, yes, he belongs to the Boston Athletic Club, but I don't know whether that is a credit or debit.

When you draw his picture stick that lodge pin of his on his coat, because he wouldn't do a darn thing if he didn't have that pin along.

His favorite pastime is attending Strawberry Festivals. Of course, you know what that means, when an automobile man gets looked up at a Strawberry Festival. Well, it's Good Night.

Outside of all this, he is all right, and it sure is a credit to the automobile business to have men like him connected with it.

Yours very truly,
(Signed) An Enemy.

Oh, I nearly forgot to tell you he is a Mason and belongs to Fifth Commandery.

If more of the companies would send us equally detailed items concerning their sales managers, our gallery would undoubtedly be a world beater.

THE BOSCH COMPANY IS TO BUILD CASINO

Plans have been filed for and work started by the Bosch Magneto Company on a casino building to cost $18,000 on N. Main Street, Springfield, Mass., opposite its factory. The building which has been contemplated for some time will be a rest and recreation structure for the employees of the company. It will face on North Main Street and the dimensions are 84 x 107 ft..

There will be a big dining hall just off the main entrance, where the employees of the factory will be able to get meals at a nominal price. The size of this room will be about 60 x 60 ft. On the right of the entrance will be a rest and game room and on the other side of the entrance will be the kitchen and serving room connected with the dining hall. The basement will be fitted with bowling alleys. Broad piazzas will run on the north and south sides of the building.

AUTOMOBILE SHOWS AT WHICH COMMERCIAL CARS WILL BE EXHIBITED

October—St. Louis, Mo. St. Louis Automobile Manufacturers' & Dealers' Association.
October 15-25—New York City. Electrical Exposition and Motor Show, New Grand Central Palace.
October 17-27—Paris, France.
October 18-November 1—Pittsburg, Pa. Show for Used Cars of all kinds. Automobile Dealers' Association of Pittsburg. W. H. La Fountain, Manager Motor Square Garden.
October 18-November 2—Dallas, Tex. Dallas Dealers' Auto Association.
November 8-15—Atlanta, Ga. Atlanta Auto and Accessory Association. Auditorium Armory.
November 24—Savannah, Ga. Savannah Auto Dealers' Association.
December—Newark, N. J. Armory Building. New Jersey Auto Trade Association.
January 10-16—Milwaukee, Wis.
January 26-31—Scranton, Pa. Armory. H. B. Andrews.
January 31-February 7—Minneapolis, Minn. Minneapolis Auto Trade Association. F. E. Murphy, Secretary. National Guard Armory.
February—Fort Dodge, Ia. Armory. Auto Dealers' Association.
February—Elmira, N. Y. Automobile Show. Frank D. Pratt.
February 7—Omaha, Neb. C. G. Powell, Secretary, 2119 Farnam St.
February 9-14—Buffalo, N. Y. Buffalo Auto Dealers' Association. J. J. Gilson, 401 Franklin St., Secretary.
February 21-28—Newark, N. J. New Jersey Automobile Exhibition Company.
February 24-March 1—Cincinnati, Ohio. Cincinnati Automobile Dealers' Association.
March—Wichita, Kans. Wichita Business Association.
March 17-21—Boston, Mass. Boston Commercial Motor Vehicle Association. C. I. Campbell, Secretary.

PIERCE-ARROW'S NEW TRUCKS

To the Editor:

In view of numerous inaccurate statements that have appeared in connection with the new model Pierce-Arrow two-ton trucks, the Pierce-Arrow Motor Car Company wishes to call particular attention to the following facts:

The truck is not of 2½-ton capacity, as has been stated in one or two instances. While the total admissible load on the chassis is 5200 lbs., this total load must include the weight of both body and paying load. If the body weighs in excess of 1200 lbs., the paying load will be less than two tons by the amount of this excess. As the average weight of bodies is 1200 lbs., the permissible average load is exactly two tons.

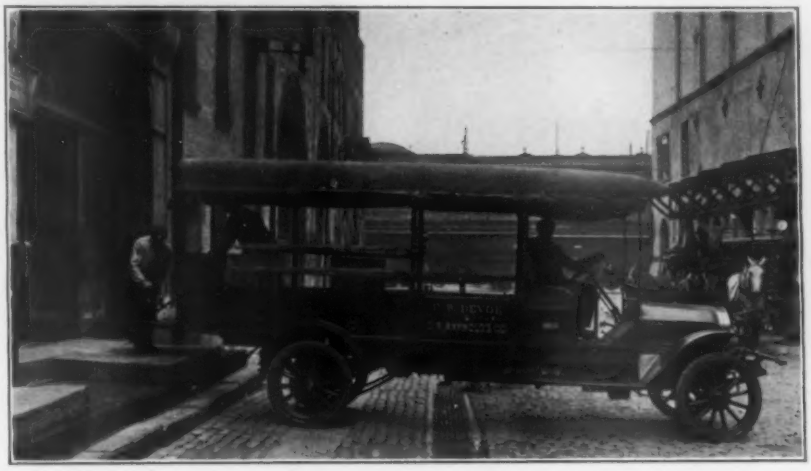
This truck is a two-ton truck without any guaranteed percentage of overload. The tire equipment is 36 x 4 in. front single, and 36 x 4 in. rear dual; not 34 x 4 in. as has been published. The service brake operates on a drum behind the transmission, by means of contracting shoes. This is not a band brake.

THE PIERCE-ARROW MOTOR CAR COMPANY.
Buffalo, N. Y.

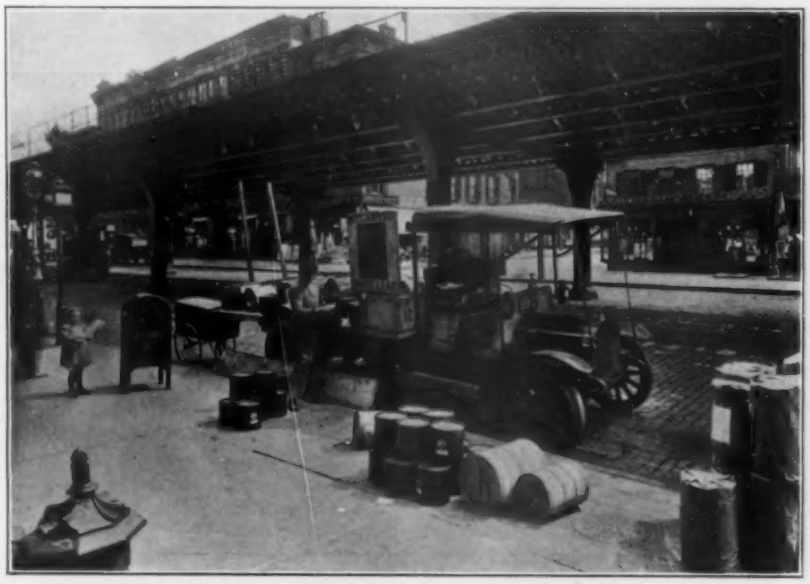
Commercial Cars in the Paint, Oil and Varnish Business

CONSIDERING the size and importance of the industry it was rather of a surprise to a representative of the C C J to find that the paint, oil and varnish trade had done little towards replacing horses with motor wagons and trucks. In this field the requirements are no more exacting than any transportation engineer is called upon to meet, in fact the trucking and delivery end of those interviewed were of the simplest order and yet as an example a city like New York can count but sixteen companies in the paint and varnish business who are using the power vehicle. All of these, however, are fully agreed that their deliveries are more regular and uniform during all seasons than before the advent of the motor truck and their loss would now represent a hardship and probable loss of trade. In the majority of cases a platform body with side board of about twenty-five inches in height best answers the requirements and these side boards should be removable in order to facilitate the loading or unloading of the many small cans. As a rule the paint and varnish trucks are without tops except over the driver. The platforms should be flat in place of the growing practice in general merchandise vehicles of sloping them toward the rear.

On account of the considerable weight of the individual packages, though small, the load platform should be as low as possible, a feature which most engineers have, with few exceptions of front drive machines, been unable to overcome. Many object to the use of wheel housings, but this is more of a theoretical one than practical, particularly as the prevailing small size of the packages permit of nice arrangement on the truck platform. The paint, oil and varnish trades should be rather attractive to motor truck men as the packages being both heavy and small prevent top heavy loads and little of the sway and twist upon bodies and frame members, which often cause as much trouble as excessive speed or neglect. But in this very fact of compactness there is a great element of danger due to overloading. A single layer of cans of paint or white lead might well represent the rated carrying capacity of the vehicle, but to the shipping clerk or driver greatly rushed or inexperienced, it would seem but a trifle with the result that the vehicle might be carrying 100 per cent. overloads a majority of the time. Due again to this compact weight, greater care should be exercised in placing the material when loading, as an equal distribution is essential, but might not be quite so convenient to the driver or his helper. An extensive canvass of the paint and oil trade brings to light a peculiar pride in the "business conservatism" of the older concerns who well might cast aside their inadequate horse delivery system. An almost universal reply to the investigator's question as to why the house had not or had taken so long to adopt motor vehicles was—"you know we are an old and conservative concern,"—without any further attempt to justify what proved in reality was nothing more or less than "old fogyism" or indifference to the march of progress in transportation.



Mack Truck Used by F. W. Devoe and C. T. Reynolds Company, New York



Saurer Used by the National Lead Company

One of the earliest to adopt the motor truck and a consistent user since is the National Lead Company, which now has in operation a fleet of eight heavy duty Saurer trucks, the first of which was purchased in 1908. Years before this the company invested in one of the first Knox air cooled trucks and the history of the efforts to sell this machine would make a good story in itself for the present day truck salesman. These Saurer trucks deliver within a radius of fifty miles and no better answer to any question of their success is the fact that the company keeps adding to its equipment. Among many of the representative users throughout the country are Sinclair & Valentine, S. Wolf & Sons, Pratt & Lambert, National Lead Company, Keystone Varnish Company, F. W. Devoe & C. T.

Reynolds Company, and Loch Brothers, all of New York; J. C. Grenell, of Brooklyn; Sherwin Williams Company, Newark; Standard Paint Company, Bound Brook, N. J.; Egyptian Lacquer Manufacturing Company, Rahway, N. J.; Harrison Bros. & Company, John Lucas & Company, N. Z. Graves Company, of Philadelphia; Parrafine Paint Company, San Francisco; Downey Cavasso Company, Oakland, Cal.; Chicago Varnish Company, Chicago, and Waters-Pierre Oil Company, of St. Louis.

AUTOMOBILE FUNERAL CARS IN NEW YORK

WHILE motor funerals are becoming more general day by day, nevertheless sentiment in this connection seems to exercise considerable bearing and the long drawn out procession of hearse and carriages is not being superseded as rapidly as one might expect in this day of motorized traffic. Appreciating the future, however, of the the self-propelled vehicle in funeral work and the traffic congestion in the larger cities, a new corporation, known as the Motor Coach Company, Inc., has been established in New York. This company will rent to funeral directors vehicles, each of which will constitute a self-contained funeral having accommodations for undertaker, clergyman, casket and twenty mourners.

The bodies follow the lines of coach practice and are mounted on three-ton truck chasses, fitted with the regular solid rubber tires. Each coach is divided into compartments with doors on either side. The forward one is for the driver, the funeral director and the clergyman. Back of this is the casket compartment, with a shelf above for flowers, then a mourner's compartment, and in the extreme rear one for the immediate family of the deceased. The exterior of the coaches is finished in dark brewster green with black striping and all metal trimming is in silver. The interior is of solid mahogany, with black or dark green silk curtains and draperies and black leather upholstery. The floor is covered with dark carpet and every effort is made towards the comfort of the passengers. The interior of the coach is lighted by electric dome lights. In winter the interior is heated by a special device taking hot air from the exhaust. It is cooled in summer by electric fans.

The company does not conduct funerals itself, simply renting its coaches to the undertakers. In New York the city is divided into three zones or territories and a fixed charge is made from each to the different cemeteries. These charges are in the majority of cases equal to or slightly lower than those for the hearse and five horse-drawn vehicles which each motor coach supplants, and are, of course, a great deal less than the charges for a motor hearse and the necessary limousines. At this time the company has three coaches in operation with plans arranged for about twenty more before the first of the year.

Packard Three-Ton Funeral Car
Used in New York City. Has room for casket, funeral director, clergyman and mourners

DETROIT POLICE BUY FORDS

Six Ford runabouts recently went into the service of the police department of the city of Detroit. Commissioner of Police Gillespie hopes to save the city $10,000 a year in automobile expenses.

ELECTRIC VEHICLE WITH SPECIAL BODY FOR MILK DELIVERY

The Detroit Creamery Company recently installed a Detroit electric one-ton commercial car for their route through the aristocratic Grosse Pointe district, eleven miles from Detroit.

The special body possesses a great many features devised particularly for milk delivery service. The sills and side-risers are protected with copper so as to eliminate wear and decay. Windows are plate glass. The interior is equipped with dome lights for the help of drivers and night workmen. The painting is pure white Vitrolite, with lettering in gold leaf pencil varnish. The wheel base of this car is 84 in., tread 58 in., tires 32 x 3 in. front and 34 x 3½ in. rear. Speed 12 m. p. h. Mileage radius, 55 miles loaded. Battery equipment 60 cells A-6 Edison.

Detroit Electric, Which Hauls Dairy Product

The Bonus System for motor truck drivers, such as is now in general use in England and parts of Europe, is meeting with favor among American truck owners and manufacturers. The system merely provides extra compensation for the drivers who establish good records of economy and efficiency in operating their vehicles. Vice-president G. W. Bennett, of the Garford Company, thinks favorably of the adoption of the plan in this country, declaring that the extra cost to truck owners is more than made up in lowered maintenance costs and longer life of the vehicles.

Standard Sanitary Manufacturing Company, of Pittsburgh, Pa., has added another 1½-ton White truck to its quick delivery fleet. This fleet is maintained for the purpose of making quick deliveries to the shops of the master plumbers with rush orders.

A SHOW OF USED CARS

The Automobile Dealers' Association of Pittsburgh, Pa., W. H. La Fountain, manager, will hold a show for used cars of all kinds from October 18 to November 1, 1913, at the same time that the E. Liberty Exposition will be held in the Motor Square Garden, Pittsburgh.

New Agencies and Branches

Hersig & Black, Nashville, Tenn., have taken the agency for the Commerce trucks.

Reynolds, A. J., 100 Lafayette Street, Tampa, Fla., has the agency for Cleveland trucks.

Keeney Garage, 239 Smith Street, Hartford, Conn., has taken the agency for the Selden truck.

M. R. M. Motor Company, 1118 Boylston Street, Boston, Mass., has taken the agency for the Wagenhals car.

Commercial Cars, Ltd., of Luton, England, manufacturer of the Commer truck, will have a direct branch in New York City.

Armstrong Transfer Company, Minneapolis, Minn., has taken over the subagency for the Menominee truck from L. S. Hadley, the northwestern representative.

J. R. Callum, who for the past eight years has been an automobile and truck salesman, has established an office and show room at 708 Granby Street, Norfolk, Va., where he will handle trucks and second-hand cars, also a full line of supplies, sundries and accessories, under the name of J. R. Callum Company.

International Motor Company, New York City, has opened a factory branch at 414 Wright Building, St. Louis, Mo., superseding the Mack Motor Truck Company, which previously distributed the trucks from 3426 Lindell Avenue. The factory branch will be conducted under the name of the Saurer Motor Company, with R. A. Hauer, recently from Chicago, as manager.

Motor Car Distributors Company has been organized with $250,000 capital at Los Angeles, Cal., by Fred W. Beau de Zart, who has been the agent for the Krebs commercial cars. The other members of the company are A. C. Labric, J. T. Bunn and Dr. C. W. Fish. The new company will continue to handle the Krebs cars, and also the Motokart in the territory west of the Rocky Mountains.

Personal Items

Fred C. Harrington, formerly with the Peerless and Atterbury Companies, has become manager of the Truck Department of Meyer, Abrams & Company, Boston, Mass.

Charles K. Thomas, formerly western representative for the Chase commercial cars, has been appointed manager of the New York branch of the Federal Motor Truck Company.

E. T. Klee, formerly of the Mais Company, has become manager of the truck department of the Gibson Automobile Company, Indianapolis, Ind. He will handle the Willys-Utility and Garford.

F. B. Ludwig, formerly sales manager of the Edwards Motor Car Company, has been appointed Southern Representative of the Velie Motor Vehicle Company, Moline, Ill., with headquarters in Atlanta, Ga.

Chas. Fisher, formerly with the Universal Motor Truck Company, has been appointed district manager of the Mogul Motor Truck Company, having all the territory east of Chicago.

A. C. Platt, formerly with Wyckoff, Church & Partridge, Inc., has been appointed manager of the American branch of the Commercial Cars., Ltd., Luton, Eng., which has decided to place its trucks on the American market direct.

An Attractive Showroom

Truck dealers as well as pleasure car dealers, nowadays, realize the importance of good-looking showrooms and attractive windows. This photograph represents the showroom of E. V. Stratton & Company, Albany dealers for Stewart trucks and Hudson pleasure cars.

MOTOR TRUCK CLUB OUTING

On August 19th, at the Marine and Field Club, on the Shores of Gravesend Bay, was held the first real outing of the Motor Truck Club, at which the fair sex participated. A large number went together by automobile, while others arrived via the usual routes.

The events of the day were a baseball game between the "Worm Drives" and the "Stripped Gears" captained by Geo. Duck and Arthur Slade. Score, 6 to 5 in favor of Duck, in spite of Umpire Howland's attempt to make it come out even. There were also events for the ladies, such as a running match and a baseball throwing contest, in which accuracy was not required. All enoyed golf, tennis, swimming, and a splendid shore dinner, while in the evening there was dancing, music and the award of prizes by C. E. Stone. Many of the party returned at a late hour by 'bus, all having had a most enjoyable day.

Miscellaneous

Wilmington Automobile Company, Wilmington, Del., has arranged for a special parts department where repairs and adjustments can be made on all trucks, as well as new parts supplied.

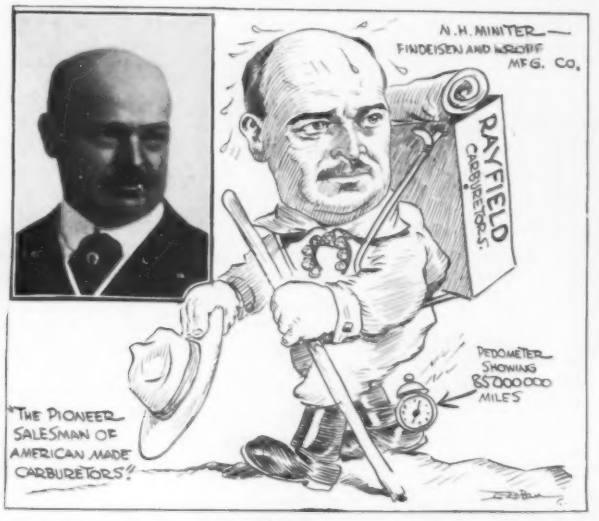
Studebaker Corporation has closed its Buffalo, N. Y., branch. In the future Buffalo Studebaker representation will rest entirely with the Studebaker retailers, A. W. Haile Motor Car Company, 1015 Main Street.

Central Garage, the Chase truck agency, formerly located at the garage of the Auto Repair & Guarantee Service, New Haven, Conn., has moved to 212 State Street. It will conduct a general repair, storage and livery as heretofore.

Used Motor Trux Company, 220 Third Street, S., Minneapolis, Minn., which conducts a sales and storage room as well as a repair department, has established a motor truck rental service. Many men have engaged in selling used cars, but this is the first company to deal solely in used trucks. The company is headed by W. W. Sill, who for fifteen years has been with the Minneapolis Lumber Company. O. G. Scheig will be associated with Mr. Sill in the sales department.

In an article entitled "A Book on Electric Starting and Lighting Systems" in our August issue we failed to give the name of the publishers—the Electric Auto-Lite Company, of Toledo, O.

C C J GALLERY of SALES MANAGERS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FINDEISEN AND KROPF MFG. CO.
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BY GEORGE, I GUESS HE'S RIGHT.
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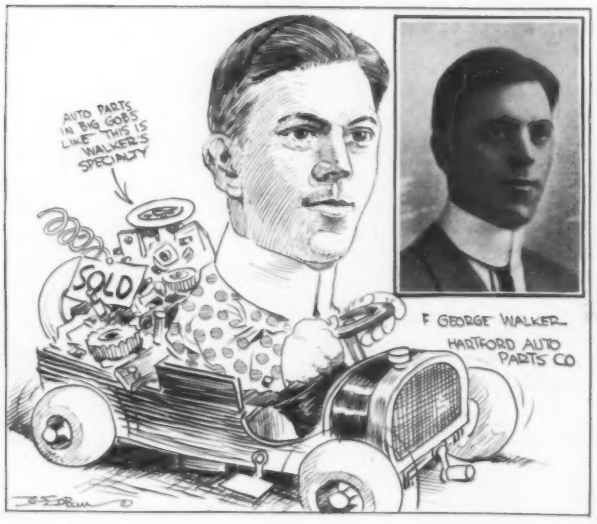
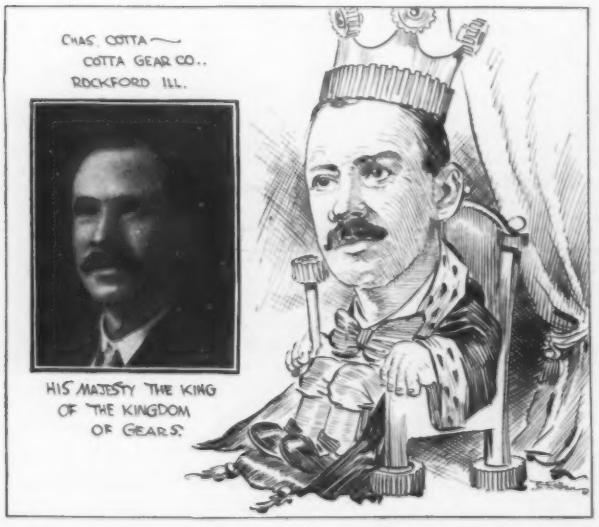
S. ELMO GROSS
DRIGGS, SEABURY ORDNANCE CO.





WELL — LET'S START SOMETHING.
HE IS ALWAYS READY TO START SOMETHING - SO HE IS SURE TO MAKE A SUCCESS OF THE STARTER BUSINESS.
F.E. MOSCOVICS -
JONES ELECTRIC STARTER CO.

Brewing Industry Uses More Commercial Cars Than Any Other Trade

By CHARLES B. HAYWARD

THERE is no single industry to which the manufacturer of motor trucks owes such a large debt of encouragement as to that of brewing. In view of the fact that at least one-third, if not more, of the total production of heavy commercial cars in this country to date, has been absorbed by brewers it will be apparent that the commercial end of the American motor industry would be far from the advanced state of prosperity that is now prevalent, were it not for the generous market that has been provided by the big establishments which cater to the ever-growing thirst for the amber fluid.

Not that the gratitude is all due on one side, by any means. The brewer is equally indebted to the commercial car manufacturer for providing a means of transportation that has enabled him, not alone to handle his heavy product at a very substantial saving in cost, but likewise to expand his business to an extent that was physically impossible with horse haulage, and which high freight rates made impractical by rail. Where beer is concerned, "delivery" means right in the dispenser's cellar, and nothing short of the "brewery direct to saloon" service that only the motor truck can offer, provides this ideal condition.

Probably the chief reason why the manufacturer of commercial cars should feel grateful to the brewer is not simply that the brewing industry offers such a fertile field for his wares, but because brewers generally proved so progressive in their early appeciation of the possibilities of the motor truck. The product of the brewery lends itself very readily to power transportation; it is very heavy and the weight of the container necessary, whether in wood or glass, is excessive. Huge quantities of it have to be transported rapidly, anywhere from a few blocks up to a matter of sixty miles or more from the brewery. All of these factors make for conditions that are just what the big commercial car is designed to meet most effectively.

Doubtless few of those who have only been recruited to the ranks of the commercial car industry within the past five years realize that the brewer was giving substantial aid to the builder of these time and labor savers long before the gasoline driven motor truck had reached a stage in its development where it could be depended upon to get there and get back—with or without a load. Brewers were comparatively heavy buyers of electric motor trucks at a time when the gasoline pleasure car was in its swaddling clothes and the commercial car was still a dream of the future. To George Ehret and the Central Brewing Company, of New York, must be given the credit for pioneering in this field, as these two companies purchased the first power driven trucks used in this country for beer delivery purposes. They were electrics, manufactured by the predecessors of the G. V. Co., and as these forerunners of the army that will marshall twenty-five hundred vehicles or more by the end of the present year, all devoted to brewers' use, have been a familiar sight around the streets of New York for more than eleven years, some idea of the sturdiness of their construction may be obtained. They were originally placed in service in 1901 and stood the hard knocks of brewery service—one of the hardest, by the way, of any to which a commercial car is subjected—for more than the decade covering the inception and development of the motor truck right down to its present status as an indispensably valuable utility. The Ehret brewery showed its foresight by investing in twelve 5-ton electrics at this early day; the Central Company, one of smaller capacity. At the time that these pioneers first went into service carrying heavy loads over the none too good pavements of the metropolis, commercial cars were such a rarity as to attract no end of popular attention.

From these lone representatives of the then coming era in which the horse is to be no more, the Ehret fleet has now approached close to the century mark, while that of the Central Brewing Company has since grown to number eighteen of the big G. V. Electrics. But more than being simply the predecessors of many others of the same make in the service of these particular companies these cars must be credited with having paved the way for a use of the electric in brewery service generally that is so widespread as to be astonishing to those not familiar with the conditions.

Electrics Very Popular

Due to the simplicity of its mechanism the readiness with which it may be handled by men accustomed to driving horse trucks and the ease with which it may be taken care of in a plant having only ordinary facilities, the electric has become decidedly popular among the brewing fraternity and from that one lone representative has grown a fleet which comprises well over a third of all the commercial cars employed in brewery service. As an approximate estimate that is pretty close to the actual figures, it is safe to say that at least eighty per cent. of all the heavy electric trucks, by which is meant those of three tons or over, are in the service of breweries, and many of them have been running constantly for from five to eight years or more.

Some idea of the great number of three to five-ton electrics in the brewery field, as well as their wide distribution, may be had from considering the list of but one make alone—the G. V. Company. This concern has supplied no less than three hundred and eighty-five big cars to brewers in various parts of the country, New York brewers naturally heading the list. The Jacob Ruppert Brewing Company has 112; George Ehret, 66; Peter Doelger, one of the pioneers in discarding horseflesh altogether in favor of motor transportation, has 55; the Anheuser Busch Brewing Association of St. Louis, 36; the Central Brewing Company, New York, 18; the L. Bergdoll Brewery, Philadelphia, 12; S. Liebman's Sons, Brooklyn, 15; Gambrinus Brewing Company, New York, 13, and so on

Part of the Ruppert Fleet of G. V. Electrics

This company operates 120 G. V. electrics. This concern is gradually eliminating its horse-drawn equipment, and the 180 head of horses which formed part of the Ruppert equipment up to the past year, will doubtless be the last in use in that establishment.

down the list which includes breweries as far west as Sacramento.

The foregoing list naturally only includes cars actually in service and not those "on order," and with the brewers, who more than any other single class of manufacturers are rapidly discarding the horse and "motorizing" their entire delivery services, there are always new trucks on order, this being one of the things the commercial car manufacturer has to be grateful for to the brewer that has not already been mentioned. Throughout this article "brewer" must be considered as including bottlers, distillers and other allied interests, as they are equally generous buyers of the commercial car who thoroughly realize that the day of the horse in their business is a thing of the past.

From the foregoing it will be apparent that despite the many prophecies to the contrary that have cropped up from time to time since the gasoline propelled car began to come into its own, the electric will ever be a factor of considerable importance in heavy as well as light haulage. From the very nature of its product and business, the brewery can make little use of light capacity units. It is safe to say that the average load of a brewery truck for the round trip is higher than that to be found in almost any other service, as empty kegs and cases of bottles are a pretty substantial load in themselves.

In addition to the advantages already mentioned for the electric, there must be added a cheap source of charging current, as the brewery is a large producer of electricity for lighting and power purposes around the plant, and it can accordingly furnish charging current for its own cars at a rate with which even the most liberal and economically conducted lighting plant cannot attempt to compete.

Representative Installations

A review of a few of New York's largest installations, their rapid growth, the service methods employed, and, above all, the very substantial economies effected by displacing the horse, should form interesting reading for every brewer who still adheres to old methods. Though he cannot benefit by the great saving his more progressive contemporaries have made in their delivery service during the past five to ten years, he can take advantage of their experience, not only being in a better position at the start in this respect, but also because of the opportunity afforded to select from commercial cars in both the electric and gasoline field that have reached a high degree of efficiency. For convenience sake, only the electric vehicles are referred to in this part of the account, a more detailed reference to the gasoline cars, which represent two-thirds of the total number employed in brewery service, being made further on.

The fact of having had the foresight to acquire twelve 5-ton electrics as early as 1901 would seem to place the George Ehret brewery in New York in the first rank as a pioneer in the introduction of the commercial car to this service. There were others who entered the field early and several of them placed comparatively heavy orders for equipment a few years later, but there were mighty few concerns in any industry that had the courage to buy a round dozen of 5-ton cars at that early day. To-day, a full twelve years later, every one of those original machines is still doing active service. This, despite the fact that they were second-hand when acquired by the Ehret concern from other brewers who were dissatisfied with their early experiences and were only too glad to dispose of the cars. That most of these brewers saw the error of their conclusions and again essayed experiments in motor delivery a year or two later was largely due to the success of their original machines under the Ehret management.

These twelve cars put in five years' steady service before the equipment was added to, two 3-ton Lansden cars being purchased in 1906; in 1908 two 1-ton machines of the same make were bought, while in 1910 seven 5-ton G. V. electrics were acquired and this order was duplicated in 1911, beside adding six 5-ton Studebaker electrics and two more 1-ton Lansdens. In 1912 six 5-ton Lansden and eight 5-ton Studebaker electrics were purchased and twenty 5-ton G. V.'s ordered. The latter, as well as others, have since been delivered, bringing the number of this one make in the Ehret service up to sixty-six. That there will be further substantial purchases of motor equipment in the next year or so is evident from the fact that in addition to the big fleet of cars employed in 1912, there were also some three hundred horses doing service. It is the intention to dispose of these and unless the policy thus far followed is departed from, they will all be replaced by electric cars, making the Ehret brewery one of the few large establishments of the kind that pins its faith solely to the electric machine.

The experience of the Peter Doelger brewery is also representative. This establishment placed its first electric in service in 1903. Naturally it was "nobody's dog" and received the lack of attention that has always favored that mythical animal. It was housed wherever most convenient, charged whenever expedient and in other ways cared for as an excrescence on an old-established utility that did not regard the new order of things kindly—nor as a dangerous rival. Despite this, the car proved dependable as well as valuable. But even at that, a solitary unit does not make a very lasting impression when its efforts are compared with the total rendered by a hundred others, so that it was six years before this first step led to others. In 1909, three more G. V. electrics were purchased, and from that point expansion followed with great rapidity. A year later, three more were installed, making a battery of seven. The excellence of the service rendered by the first four cars compared so well with double the number of horse trucks that a policy of transition from the horse to a completely motorized service was decided upon, and the next three machines were ordered as the first decisive step toward this much-to-be-desired end.

In 1911, the opening order was for sixteen 5-ton G. V. trucks, and it was followed by another shortly afterward for eight 3½-ton trucks, so that in a period of three years, the motor equipment increased from one old-timer to forty-one machines in all, ten gasoline trucks of foreign make having been added as well. The experience with this fleet proved so satisfactory, that the first order for 1912 was for sixteen more 5-ton electrics of the same make, and it was shortly increased by another order

Peerless Truck Used by the Roessle Brewing Company, of Boston, Mass.

This company uses the truck for hauls anywhere from two to eight miles, and they find that after charging twenty-five per cent. a year for depreciation, charging the pay of the operator at $20 a week and two helpers at $17 a week, and all other running expenses, they saved, in 1912, $1300 on the operation of each of three Peerless trucks as compared to the cost of doing the same work with teams.

for twelve more, making twenty-eight 5-ton cars purchased in that year. Following the policy of disposing of out-of-date equipment, the five original trucks were sold in 1912, and another 5-ton electric has since been added, bringing the total number in service to fifty-five.

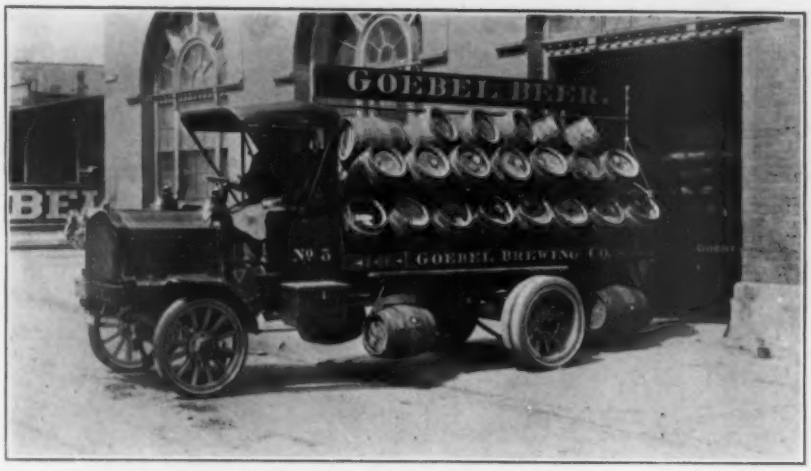
The housing and maintenance of this large number of heavy machines, beside an equally imposing array of gasoline cars for long distance delivery presented quite a problem in garaging, but it was not difficult to solve owing to the great amount of yard space left free by disposing of the wagons. Several city lots were necessary for this purpose alone. In addition, a barn covering an area 100 by 200 ft. was necessary for stabling the hundred and thirty-five horses, besides a blacksmith's quarters and repair shop for the wagons. Contrast this with the 85 by 100 ft. space required for the garage with a capacity of one hundred and twenty commercial cars, which it has been figured will be sufficient to take care of the necessary expansion for several years to come.

The history of the growth of the Ruppert installation has been somewhat similar, except that it was inaugurated on a larger scale and has already grown to very much greater proportions. Four 5-ton electrics were acquired in 1903, and three 3½-ton electrics were added in 1907. Then there was a similarly tremendous advance in the number, no less than thirty-five 5-ton electrics being purchased in 1911, followed by another thirty-five in 1912, the latter order consisting of four 2-ton cars, two 3½-ton and twenty-nine 5-ton trucks, bringing the total to eighty-three, of which sixty-eight are of 5-ton capacity. Up to the present writing, thirty-nine more electric cars have been added, making one hundred and twelve in all. But, as is the case in most of these big installations, the four original vehicles purchased in 1903 are still running, and, with the care given their maintenance they appear as fit, after ten years of service, as do the newcomers which have just joined the ranks of this imposing fleet. Some idea of what such an aggregation of commercial cars means may be obtained from the photograph showing a line which represents but a small part of the installation.

For their accommodation and maintenance, a garage with a capacity of one hundred and fifty machines has been erected, and as in the case of the Doelger brewery much valuable realty formerly used for wagon storage and stables is now available for expansion of the plant itself.

Service Methods

The delivery service of a modern brewery extends in every direction and must adequately cover a territory of many square miles. Routes will accordingly vary from a few blocks up to the long hauls represented by distant suburban deliveries and everything in between. Moreover, the demand for the product fluctuates within equally wide limits and the system must be sufficiently flexible to admit of immediate and generous expansion of facilities when required, as in the hottest summer months. With few exceptions, the drivers are graduates from the reins and have been in the employ of the same establishments for many years. They put in eight hours a day, the working day of the first shift beginning at 3 a. m. in summer and at 4.30 a. m. in winter. When it is borne in mind that the Ruppert brewery serves more than 1600 customers, many of them at daily intervals, the demands upon the delivery system of a modern brewery may be realized. Routes are plotted to serve the greatest number with the minimum travel. Distance, number of customers on a route, highway conditions, traffic and probable causes of delay, capacity and speed of the vehicle are all factors that enter into the problem. Some routes, such as the long distance suburban hauls, can be covered in a single trip; others require two and three trips.

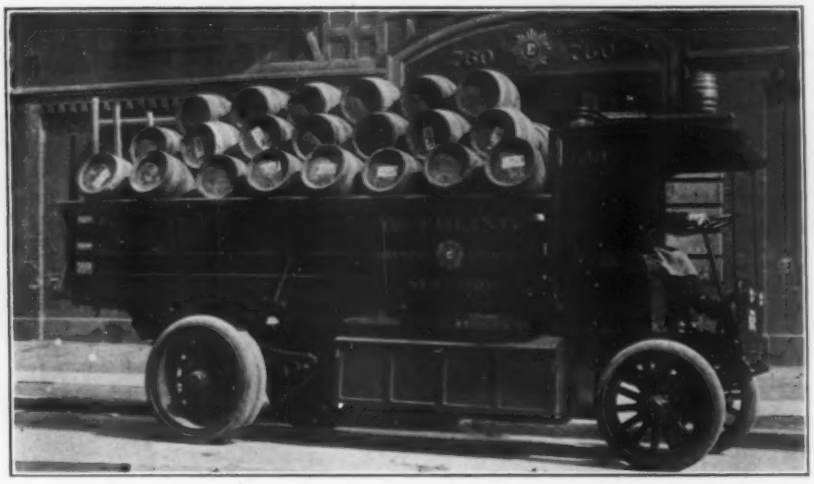


One of the Five-Ton Packards Used by the Goebel Brewing Company, of Detroit
This company uses a special body instead of the solid platform crib. One of the trucks in this fleet averages 1130 miles a month

A half-barrel, or so-called "keg" of beer weighs about 220 lbs. Fifty to fifty-two of these constitute a full load for a 5-ton truck, and in this respect there has been no increase in the unit capacity, as this is also the rating of the large horse-drawn wagons. But while horses could only cover an average of 12 to 15 miles daily with this load, the electric car's average mileage is 35 miles per day, and that of the gasoline trucks 50 to 65 miles. It has not been considered practical to increase the size of the largest unit above the 11,000-lb. limit so long in use, but the speed and in consequence, the distance, have been doubled and trebled. The radius of the 5-ton electrics on a charge is thirty-five miles at 7 miles per hour; of the 3½-ton size, forty miles at 8 miles an hour, there being little unproductive mileage as the big truck that takes out fifty-two full kegs will return with 60 to 80 "empties."

Deliveries begin at a very early hour for a number of reasons. Traffic is very scant at that time, customers can attend to receipts promptly when business is slack and the product, coming right from the cold storehouse is subjected to less variation of temperature. Immediately upon reporting, the driver is assigned to a certain machine which is all in readiness. Six minutes is the time allowed at the Doelger brewery for loading the fifty kegs and two to four big trucks take on their cargoes at once. The driver and his helper receive the kegs at the loading platform, and no matter how quickly they get them aboard and are off, there is an endless stream of the rolling kegs always ready, so that an average of eighteen vehicles, or ninety tons an hour, is steadily maintained. A full load of one hundred and eighty cases of bottled beer weighs practically as much as the 50 half-barrels carried by a 5-ton machine, but, except for long distance hauls, the product in this form is usually delivered by the 3½-ton machines, their complement consisting of one hundred and forty racks of 24 pints each. These cars are equipped with regular delivery bodies of the enclosed type, protected at the rear by a heavy wire grating. Heavy loads on routes involving the longest hauls are naturally sent away first, but deliveries within a radius of twenty miles are usually taken care of by the electrics.

The patronage of summer resorts, recreation places and the like, such as Coney Island and its numerous lesser replicas around the metropolis, form a heavy part of the business in the summer months. For instance, Coney Island, which is 17 to 18 miles from the brewery, is only open four months in the year. The system resolves itself into three divisions; the superintendent is responsible for delivering the product where it is wanted; the manager of the shipping department provides the loads and looks to the garage manager to supply the vehicles and he must have them in line as needed. This naturally involves a maintenance system of a high order of efficiency. The garage manager must know the exact condition of every machine at his disposal, whether gasoline



Atlantic Electric Used by the Ebling Brewing Company, of New York

or electric, every day in the year, so that he can supply the shipping department with a car capable of meeting its requirements.

Supplementing the systematized attention which makes service of this nature possible, there is the emergency wagon which plays an important part in the scheme of maintenance. Like the emergency wagons of the street railways, it is completely equipped with "first aid" appliances beside which it carries whatever spares the report of the driver of the disabled machine show are necessary.

Such a well-maintained system naturally calls for an equally systematic method of recording the condition and the service rendered by each machine, and incidentally the cost. For the electric cars this is taken care of by a system of five blanks, the first of which is the "Charging Sheet."

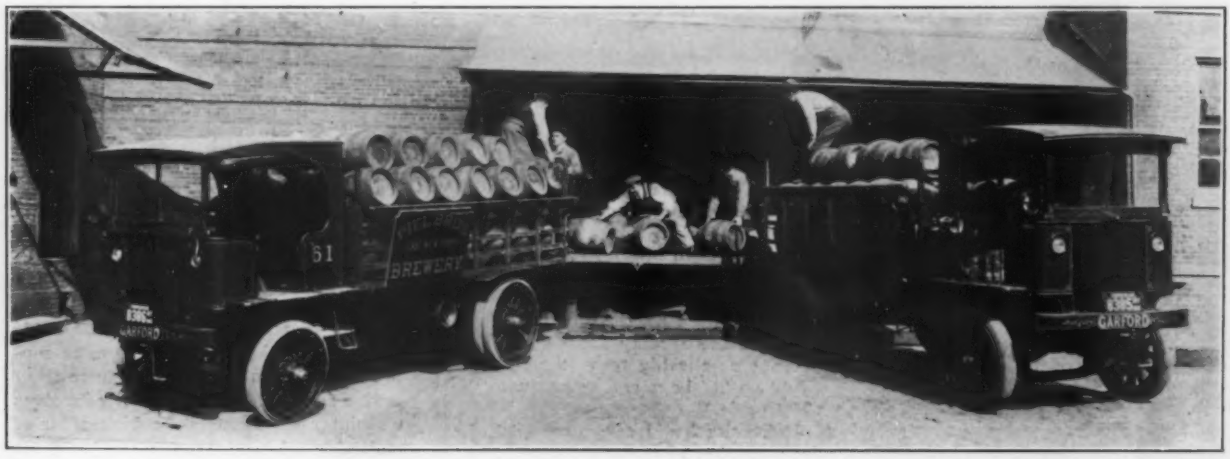
The items of this sheet are transferred to the "Current" column of the large sheet, giving detailed costs of every nature. There is also an inspector's report sheet, and a driver's daily mileage sheet, reports of this nature being filed by the different departments for the gasoline as well as the electric cars. Each vehicle is given a consecutive number and is thereafter identified by this alone, and upon returning the driver not only gives his mileage, but also reports the condition of the machine and when the latter indicates the necessity for attention a specific inspection is made. In addition to this, there is a routine daily inspection or general examination of the cars to keep close track of the effects of wear and tear, the tires in particular being very closely looked after.

It will be noted from the report blanks that each vehicle is considered as a unit and that careful record is kept of the entire time spent in keeping it in condition, even covering such routine duties as washing, oiling and the like, beside which all material and replacements necessary for its maintenance must be strictly accounted for. If a car is withdrawn from service, the date and cause are noted, and a similar record is made when it goes into commission again. Each day the total cost and the total mileage is entered and the cost per mile figured.

Some Surprising Figures

While the extent to which the electric is employed in this field is a revelation, the total number and valuation of commercial cars used by brewers is little short of amazing, and when it is considered that at least seventy per cent. of this huge fleet of motor vehicles has only been accumulated during the past five years, some idea of the great future of the commercial in this and other fields may be obtained. In round numbers, there are eight million dollars' worth of commercial cars in the service of breweries and allied interests today, representing a total of close to 2,500 cars of all types. But the most surprising feature of the situation is that this great array of cars is at present confined to the use of an almost insignificant percentage of the total number of breweries. While the capitalization of these concerns forms a very substantial proportion of the money invested in the industry, they are but a fraction of the number in business. There are almost 800 breweries in this country and Canada, and less than thirty of the more prominent own almost a thousand big commercial cars, easily representing two-fifths of the number in use. Reducing the matter of proportion still further ten of the biggest breweries in the country total close to six hundred trucks with a valuation approaching two million dollars. For instance, the Peter Doelger Brewery, which has abandoned horses and wagons for good and is selling its old equipment as fast as it can be disposed of, has eighty-six cars; George Ehret has eighty-eight, while Anheuser-Busch reached a total of one hundred and fourteen cars early in the present year, and the Ruppert Brewery in New York tops the list with a showing of one hundred and twenty-nine.

The metropolis can not only boast of the greatest single fleet of commercial cars, but its section of the brewing industry also affords the largest single market. Ten breweries in Greater New York run up a total that is rapidly approaching the half thousand mark, as



Garfords in Use by Piel Brothers' Brewery, East New York

About fifty half barrels or kegs of beer constitute a full load for a five-ton truck. About six minutes are allowed for putting on a load

they now employ more than four hundred and fifty trucks in addition to hundreds of horses.

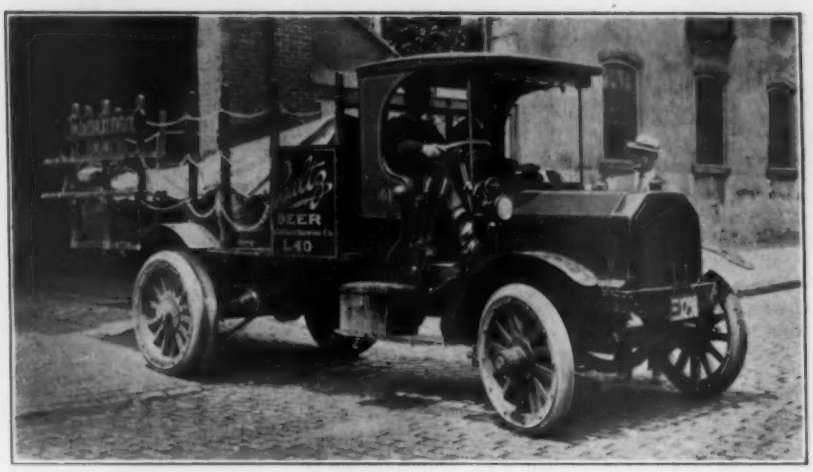
Rather than sacrifice the heavy investment they represent, the brewers continue to use their horses until they are worn out, replacing them as fast as they disappear with commercial cars. This policy, in connection with the fact that the growth of the business is entirely taken care of by new motors, accounts for the ability of the brewers to absorb new power equipment. When it is mentioned that one brewery in New York which already has thirty commercial cars, is still operating almost two hundred horses, the extent of the market this industry affords can be realized.

The Rôle of the Gas Truck

While the electric vehicle has made it possible for the brewer to deliver his product economically and effect great savings in valuable city real estate owing to the decrease in the amount of storage space required, the gasoline truck has made possible a very important expansion in his business that never could have been accomplished with horses. This is the long distance delivery service of which every metropolitan brewer as well as those in other cities, such as St. Louis, Chicago and Philadelphia make a prominent feature. New York brewers can now serve outlying districts on Long Island, in Westchester County and suburban New Jersey with the same facility that beer is delivered within the city limits and this has been responsible for a very substantial growth in the business.

It must be borne in mind, of course, that these two general classifications of the service only apply to establishments in the large cities. In the smaller cities and towns, there are a great many breweries owning anywhere from one to ten cars. These machines are almost invariably of the gasoline type and usually take care of a large proportion, if not the entire product. As examples of the widespread use of such installations, it may be mentioned that there are 75 Kelly-Springfield cars in groups of two, three and four in breweries all over the country. There are one hundred and six breweries in sixty-four different cities using Packard trucks, the Anheuser-Busch establishment having twenty-one Packards, mostly of the 3-ton size, which are used both at the home plant in St. Louis and at its various distributing stations in other parts of the country. The International Motors Company has no less than three hundred and forty-eight trucks of the three different makes it builds in the service of brewers, and a resume of the distribution shows that the demand in this field is not for heavy units alone; also that cars heavier than the 5-ton type so generally favored, can be profitably employed. For instance, there are six 1-ton, five 3-ton, nine 5-ton and eighteen 7-ton Hewitts in brewery service; thirty-eight 5-ton and twenty-nine 6½-ton Saurers; seventeen 1-ton, twenty-three 1¼-ton, thirty-three 2-ton, forty-seven 3-ton, nineteen 4-ton, eighty-seven 5-ton, eight 6-ton and ten 7½-ton Mack trucks in use, the number of this make alone totaling two hundred and forty-four cars. While the gasoline truck has not as yet approached the electric for big fleet records in brewery service, the number of gasoline commercial cars sold to brewers annually is greatly in excess of that of its slower-moving competitor and it is likewise increasing much faster. There are already thirty or more brewers operating ten or more gasoline trucks each, and as so many breweries are now in the transition stage where their delivery service is concerned, it will be evident that the market for this type will be years in approaching saturation. Even in New York, which can boast of having a greater number of commercial cars in brewery service than any other city in the world, there are still thousands of horses used. A team of brewery horses costs $800 to $1200 and with the wagon, represent an investment of $1600 to $2000 for each unit. As a gasoline truck replaces two to three teams, it will be evident that so far as investment goes, discarding the horses in favor of motor trucks does not call for any increase in the outlay necessary, while there is a decided saving in storage space and operating expense, not to mention the sanitary advantages. The rate at which commercial cars are being bought for this service may be judged from the fact that there was an increase in the total number during 1912 of more than 100 per cent. While such a tremendous ratio of increase naturally cannot hold good for many years, so many of the smaller breweries are waking up to the advantages of power delivery, that it is bound to be a very large proportion for a long time to come, particularly as many of those which already possess large fleets must add more from time to time to take care of expansion.

While it would be out of the question to give detailed information of the service rendered by gasoline cars in brewery delivery operation in any great num-



One of the Peerless Trucks Owned by the J. & P. Baltz Brewing Company
This concern reports a saving of $1300 on each of their Peerless five-ton trucks during 1912, as compared with horses

Five-Ton Saurer Trucks Used by Well-Known New York Brewers

ber of instances, a few typical examples will be of interest, particularly as they are representative of the experience of users in this field in general. An eastern brewing company recently installed six 3-ton Packard trucks, displacing 54 horses. These cars cover a total of 300 miles a day. Three of the machines make a round trip of 24 miles twice daily, while the other three, on a similar schedule, make round trips of 23 miles. In handling these hauls by horses, each wagon was able to make but one trip a day and a team could be worked only on alternate days. The Goebel Brewing Company, Detroit, has been using Packards since 1909 and recently added its fifth car. One of the trucks of this fleet, assigned to suburban delivery makes 1134 miles a month, while three of the others cover 25 miles a day, giving a combined total for these four machines of 37,908 miles annually. The Goebel Company uses a special body instead of the solid platform crib frequently employed on heavy trucks in brewery service. In this type, two outer and two inner beams extend the full length of the body—a design often used by brewers on horse-drawn wagons. The Lemp and Union breweries, St. Louis, and the Gottfried Krueger Company, Newark, also have good sized fleets of Packards.

The Baltz Brewing Company, Philadelphia, has been operating three Peerless 5-ton trucks for some time and reports a similarly favorable service, while the builders of the Peerless, also the Pierce-Arrow have a number of brewery customers, using one or more of their trucks.

Judging from the examples already cited and those which follow, the class of vehicles favored appears to depend largely upon what type was selected originally. An instance of this where the gas car is concerned is found in the case of the Lion Brewery, New York. This company started with one 5-ton gasoline truck in 1906 and now operates something like 25, about one-fifth of which are electrics. A 5-ton Hewitt purchased in 1907 was the second addition, and a 7-ton truck of the same make was bought in 1909. To take care of the great expansion in distant delivery demands, four more 7-ton and three 3-ton Hewitts, as well as two 5-ton Macks were acquired in 1910. The 1911 requirements were taken care of by the purchase of three 5-ton Reliance trucks. Up to this time the service had been carried out entirely by gasoline cars, but in 1912, four 5-ton G. V. electrics were bought and the gasoline fleet was further added to by three 5-ton White cars. Territory lying within a 30-mile radius on Long Island and Westchester County is served by direct delivery, most of the demand arising from new business made possible by the gasoline trucks.

New York City can boast of exclusive installations of both classes, the Ehret brewery as already mentioned, confining itself entirely to electrics and operating sixty-six G. V. electrics, while the John Eichler Brewing Company is a representative of the all gasoline class. This dates from 1909, when a 3-ton Packard was purchased. In the interim a number of others have been added, including two 5-ton Macks, one 5-ton Mercedes, one 6-ton Benz-Gaggenua and four more Packards and the service rendered is interesting as showing one of the most important roles of the gasoline truck in brewery service. Before entering the field, the only way beer could be sent to the White Plains depot of the concern (about 22 miles) was by freight, and it was nothing uncommon for shipments to be tied up for more than a day, which resulted in great inconvenience. From the depot the kegs had to be delivered by horses and wagons and the empties found their way back to the brewery by the same roundabout process. Now the entire territory that this depot formerly served, as well as others, is taken care of directly by the gasoline cars.

A Fleet of Ten G. V. Electrics

These trucks are giving splendid service on the Kansas City hills and are owned by the George Muehlebach Brewing Company

That the abandonment of sub-stations in favor of direct delivery is a wise policy, however, is questionable, as one of the most economical methods of delivery over a wide area is by means of sub-stations served directly by larger units from the brewery and distributing the product in smaller units from the station. This accounts for the increasing number of 6 and 7-ton gasoline trucks acquired by brewers within the past few years. The Ruppert Brewery in New York has probably carried this plan—which by the way has been in use for a long time by the department stores—to a greater degree of development than most of the others. Stations have been established in Hempstead, Long Island, New Rochelle, N. Y., and Hackensack, N.J., these three being points on a circle of about 20-mile radius; two others have also been established at Mamaroneck, N. Y., about 26 miles, and New Haven, Conn., 75 miles from the brewery. Cold storage rooms have been built at these stations so that local orders can be attended to promptly. They are supplied from the home plant by the big gasoline cars which for this service are sent out at night, the local distribution being by means of 2 and 3-ton electrics and gasoline machines, one 3 and one 5-ton Mack truck each constituting the equipment of the Hempstead and New Rochelle stations, which have now been in service for almost two years. For supplying these stations, 6 and 6½-ton gasoline trucks are employed, and, owing to the distance, they average close to 70 miles per day.

Ballantine Brewing Company's Malt Wagon

A unique malt wagon used by the Ballantine Brewing Company. The body is mounted on a five-ton G. V. electric chassis

While New York brewers can lay claim to a large share of the pioneering work in the introduction of the commercial car in their delivery service, those in other cities have not been slow to realize the advantages and economy of motor haulage. Philadelphia is a close second to the metropolis in its fleets of "beer arks." By the end of the present year there will be 150 or more in the service of Philadelphia brewers. As is the case in New York, electrics predominate, the American Brewing Company, which has had a completely motorized service ever since 1909, employing this type entirely. Most of its equipment is made by the Commercial Truck Company of America. Where numbers are concerned, F. A. Poth & Company, heads the list with 35. The bulk of this fleet consists of thirty-one 5-ton G. V. electrics, in addition to which there are two Commercial electrics, a 5-ton Pierce-Arrow and a 5-ton Mack gasoline truck. Others having extensive motor equipment are the Louis J. Bergdoll Brewing Company, C. Schmidt & Sons, A. Erdrich & Son, the Adam Schmidt Brewing Company, Arnholt & Schaeffer and the Theodore Finkenauer Brewing Company. Of the fifteen in the Bergdoll service, thirteen are electrics, nine of these being G. V.'s and four of Commercial make, in addition to which there are two 3-ton Mack gasoline trucks. The C. Schmidt brewery also has fifteen cars, six of which are of the gasoline-electric type, built by the Commercial Company.

The equipment of the Finkenauer brewery is a parallel to that of George Ehret in New York, on a smaller scale, in that it employs electrics exclusively, and will shortly eliminate the horse entirely. Since 1911 eight electric cars, all of Commercial Truck Company's make, have been acquired to take the place of sixteen teams of horses. Another exclusive user of the electric is the Erdrich & Sons brewery located in a suburb of Philadelphia. This concern operates eight G. V. trucks, the first of which was bought in 1903; two more were added in 1904, another in 1910 and four in 1912.

Substantial Economies Effected

"Do you know why we are so enthusiastic about electric trucks?" asked Superintendent Jean E. Blaise, of the Peter Doelger Brewery of his audience at the Boston Convention in 1912. "Just dollars and cents." And it is just dollars and cents saved that is making every other brewer enthusiastic about replacing his horse equipment with commercial cars of one type or the other. According to Superintendent Blaise, it cost the Doelger brewery 35 cents per barrel to deliver beer by horse-drawn wagons within an eight-mile radius. The electric trucks in the same service reduced this to 15 cents per barrel and it is expected with the development of the system, this may be further reduced to 12½ cents. At the 15 cent rate, the Doelger brewery is saving $80,000 a year on its delivery service as compared with horses. In addition to this great economy, the greatly decreased storage space required —85 by 100, instead of 350 by 350, as needed for stable and wagon yards, has released no less than 28 city lots, valued at $560,000. At 5 per cent., this represents another $28,000 a year. This brings the total saving over a hundred thousand a year, or close to $1500 per machine per year. As the real estate thus made available has been utilized for the erection of additions to the bottling plant for which other space would have had to be purchased, this is not merely a "bookkeeping profit," but an actual saving.

The "unforeseen contingency" is the most expensive item of any horse delivery service. In the summer of 1911, more than 1700 horses dropped dead in the streets of New York in one week, and as the hot weather marks the "peak of the load" in the brewers' delivery service, it is only reasonable to presume that a substantial proportion of these horses were drawing brewery wagons. The experience of the L. Bergdoll Brewery in Philadelphia is even more to the point. Due to an epidemic, this concern lost $15,000 worth of horses in six months, and it was this fact more than anything else that led this firm to motorize its service so completely. The Finkenauer Brewery in Philadelphia also reports substantial saving due to the use of trucks, fewer drivers and attendants being necessary besides which the ground covered by a stable has been made available. This land is valued at $20,000. That these economies are possible with small installations quite as well as with extensive fleets of cars will be evident from the experience of the M. Groh Brewing Company, in New York. Thirty-four horses and eight wagons were replaced by six 5-ton electrics of G. V. make, and the first year's showing resulted in a saving of close to $600 per machine, this amount not including contingent advantages such as the release of realty, loss of horses by reason of hot weather or accidents.

In another brewery, six 3-ton Packards displaced 54 horses. Before motorizing its service it cost this company $23,000 a year in round numbers to make delivery with horses. The cost of operating the six trucks, including "overhead," such as the items of depreciation, interest and insurance, in addition to the usual operating charges, was $12,745, making a saving of more than $10,000 per annum, or a reduction in cost of delivery amounting to about 45 per cent. The Baltz Brewing Company reports a saving of $1300 on each of its Peerless 5-ton trucks during 1912, as compared with horses. This figure is the net after deducting 25 per cent. for depreciation,

AMERICAN TRUCK A WINNER IN THE PHILIPPINES

Recently the quartermaster's department of the United States army tested an American truck—the Peerless—on Benquet Hill, Baguio. This road is known throughout the East as the most difficult on which anyone has attempted regularly to operate motor vehicles.

For this use the Government purchased some time ago a number of specially built French trucks, because at that time no American truck was available which could perform the necessary service. The French trucks had two-ton chasses and five-ton radiators and five-ton motors. One old-style American truck of a well known make is used, but the regular power plant is supplemented by a motor taken from a steam touring car and attached to the jack shafts.

The French trucks have satisfactorily made the haul with loads of two tons, but use more gasoline for that load than the Peerless used for three and four-ton loads. On its various trips during the trial the Peerless truck carried freight weighing from 6340 to 10,900 lbs.

On one run when it carried 6340 lbs.—340 lbs. over normal tonnage—the truck made the distance in three hours and twenty minutes, beating the regular freight train schedule. At the conclusion of the test the Government immediately purchased the only two Peerless trucks that were in stock in Manila and began negotiations for several more.

Peerless Truck Used by the United States Government, in the Philippines

Wholesale Meat Packers Can Deliver Their Product Cheaper and in Better Condition With Trucks

Sulzberger & Sons Operating an Average of Twenty-eight Machines—Excellent Cost System Shows .002 Cents Average Cost Per Ton Mile—Speed of Vehicle Eliminates Refrigerator Bodies

ONE of the largest users of both electric and gasoline machines in the meat industry is Sulzberger & Sons' New York branch of this large meat packing firm.

As far back as 1906 it was determined that the metropolis had grown to such proportions that horse vehicles were inadequate to properly care for deliveries. Late in 1906 a one and a half-ton General Vehicle electric was purchased and was soon followed by three others during 1907. These were put in service on street deliveries, covering both the Bronx and Brooklyn, within a radius of fifteen miles of the plant on First Avenue between Forty-Fifth and Forty-Seventh Streets. In fact, they were sent on any delivery within the range of their batteries. Some of these were used in deliveries of particular products, such as lard, bacon, etc., while others carried miscellaneous loads to the dealers, hotels, etc.

The service of these electrics proved so satisfactory that during 1910 there were added ten 3½ ton General Vehicle trucks, making fourteen electrics in service. These electrics, together with the horses still retained in service, were sufficient to cover all points within fifteen to sixteen miles, the horses being used principally at the docks and freight terminals where the well-known congested conditions existing in New York make it advisable not to send the trucks.

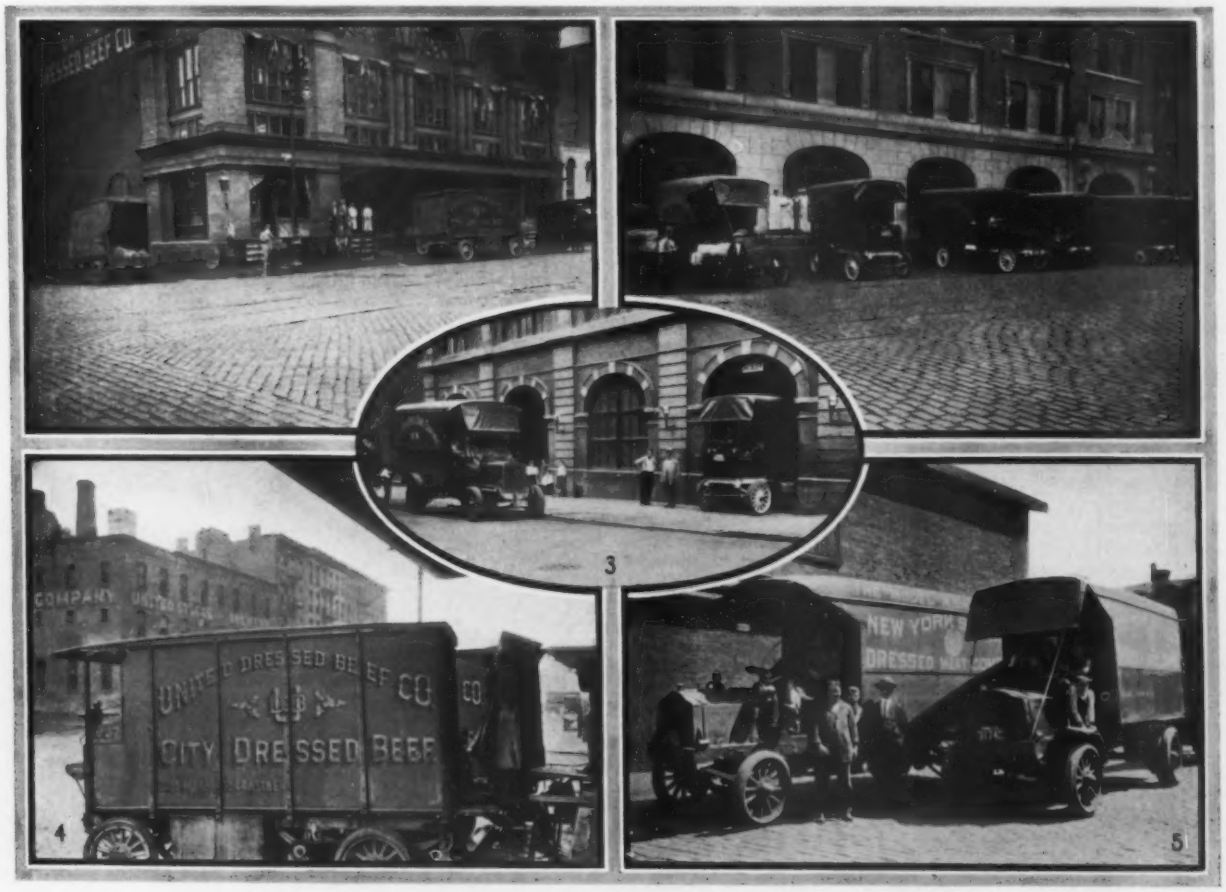
Gasoline Machines Necessary for Long-Distance Work

It was found, however, that the long distance and suburban trade could be greatly extended and increased if direct deliveries could be counted upon, and for this work gasoline machines were purchased.

In 1910 two 3½ ton Commer trucks and one 5-ton were added. In 1911 two 3-ton Kelly's were purchased. In February, 1911, four 4-ton Benz trucks were put in service, also two 4-ton Mack trucks, and in August, a large 6-ton Benz was also purchased. A five-ton Garford was added in 1912 and the latest purchase was a three-ton Kelly put in service this year, making in all twenty-eight motor driven vehicles, equally divided between gasoline and electric.

The New Field

It was soon found that an entirely new business was being established by the gasoline vehicles in suburban territory beyond the rate of horses and which had previously been but lightly touched upon through railroad freight and express shipments. Points on Long Island, such



Electrics and Gasoline Trucks in the Service of New York Meat Houses

1. The United Dressed Beef Company's establishment. 2. Sulzberger & Sons Company's packing house. 3. Garage of the Sulzberger Company. 4. A few of the G. V. Electrics owned by the United Dressed Beef Company, being loaded. 5. Packard trucks in service of the New York Butchers' Dressed Meat Company.

as Jamaica, Coney Island, etc., and districts even at Eightieth Street, which were never before covered, now receive daily deliveries; in fact, the trucks go right up on through the country, often making points forty to forty-five and even fifty miles from the plant; Mount Vernon, New Rochelle, Larchmont being now supplied through a regular quota of wholesale and retail butchers who are purchasers. The trucks also go over to Staten Island and into Jersey.

The Drivers

Superintendent Gurber when questioned in regard to the drivers, expressed himself heartily in favor of breaking in old meat men who had been in the business as horse drivers, and said that practically all of their drivers were of this class. These men get more money than when driving horse vehicles, get home earlier and are better satisfied. Nearly all of them live in the vicinity and a "Caller" is detailed to visit their homes and get them up in the morning. As a rule the men who sign in first at night receive the first cars out in the morning, and each as far as possible is assigned to the same truck so that he can be held responsible for its condition.

Recording Instruments Used

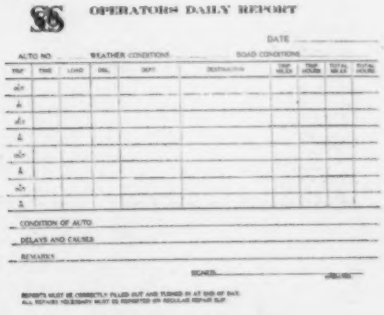
To save expenses on this large investment in trucks and to insure efficiency each machine is fitted with a Recordograf supplied by the Delivery Supervision Company. These instruments supply a strip or tape record giving every movement, time of stops, duration, speed at any time, in fact, every movement of the vehicle is graphically shown.

Mr. Gurber in speaking of the use of the recording instruments mentioned the unusual case of one of his trucks as having been driving too slow over the bridge to Brooklyn, thereby retarding traffic; the officer claimed that the truck was going at less than eight miles an hour. The matter was immediately brought to court and the tape showed that the machine had averaged between ten and twelve miles an hour; fourteen being the limit imposed by the company on its drivers. The tape record was, of course, accepted and the case discharged.

All of the cars make as far as possible two runs a day. The horses which are still used, as before mentioned, for delivery to freight cars and docks, are favored as much as possible and not given two trips. Each vehicle is numbered and an average record of its performance kept.

The Accurate Cost Record System

The most systematic records are kept, there being an operator's daily report card which covers weather conditions, road conditions, time in and out, loads carried, destination, miles traveled, hours on the trip, etc. There is also a weekly automobile report which is made up from these. There is a form for battery charging, one for the oil report and another for repairs. A report of the amount of gasoline, oil and grease is also required of each individual truck. These sheets, although somewhat numerous, as they also include individual records of the batteries, are cared for by one clerk. As these forms are more or less similar in other lines of business, which have already been produced, we will simply show the operator's daily report.



OPERATORS DAILY REPORT

DATE

AUTO NO. WEATHER CONDITIONS ROAD CONDITIONS

TRIP	TIME	LOAD	DEL.	DEPT.	DESTINATION	ODO. READ'G	TIME HOURS	TOTAL MILES	TOTAL HOURS
1ST									
A									
2ND									
A									
3RD									
A									
4TH									
A									
5TH									
A									

CONDITION OF AUTO

DELAYS AND CAUSES

REMARKS

SIGNED

REPORTS MUST BE CORRECTLY FILLED OUT AND TURNED IN AT END OF DAY.
ALL REPAIRS YESTERDAY MUST BE REPORTED ON REGULAR REPAIR SLIP

Cost Per Ton Mile

From these data have been compiled by Superintendent Gurber the figures showing the actual cost per ton mile for delivery of meats by motor truck, both gasoline and electric. We herewith reproduce the report of the General Vehicle truck No. 211 and of a four-ton Mack truck No. 204, of the cost of operation by motor trucks in this class of service. These reports show every item connected with the expense of the vehicles. It will be noticed that interest at 6 per cent. on the investment, depreciation, not only of the vehicle, but of the battery and tires; fire and liability insurance, garage expenses and all repairs are recorded; also the number of

S.105 1M 5-22-13

(THIS FORM TO BE SENT IN PROMPTLY AT EACH CLOSING DATE)

\#211

ELECTRIC MOTOR TRUCK REPORT

Kind of Battery 21 TH Gould 5 WEEKS PERIOD ENDING Aug 1 1913

Packing House Branch House New York Make of Truck B.V. Factory No. 165-2

Driver Chas Ramp Capacity 3½ Tons Date of Purchase June 20/10

		WEEKS PERIOD	WEEKS TOTAL OPERATION
1.	Number of days operated	30	
2.	" hours "	109 15	
3.	" pounds hauled	348 000	
4.	Mileage	804	
5.	Number of loads	55	
6.	Average number of pounds per load	6327	
7.	" " miles per load	14.6	
8.	Cost per mile for electricity	.011	
	EXPENSES		
9.	Interest, 6% on $ 1772.05	10 20	
10.	Depreciation Truck (See instructions)	24 30	
11.	Depreciation Battery (See instructions)	38 88	
12.	Depreciation Tires (See instructions)	36 65	
13.	Fire Insurance, cost per year		
14.	Liability Insurance, cost per year	7 50	
15.	Labor (Driver and Helper)	95 00	
16.	Extra Help		
17.	Garage Expense	13 85	
18.	Electric Power 392 KWH at .01 per KWH	8 92	
19.	Distilled Water Gal. at per gal.		
20.	Acids " at "		
21.	Lubricating Oil 1/4 " at 32 "	08	
22.	Grease 5 Lbs. at 05 per lb.	25	
23.	Minor Repairs to Tires		
24.	Estimated Repairs (Except battery and tires)	43 27	
25.	Miscellaneous, License, Tolls, etc.	10 31	
	TOTAL EXPENSE	259 33	
26.	Average cost per cwt.	.024	
27.	" " Ton Mile	.105	.0018
28.	Actual Repair Expense for Period $ 23.27 Itemized on the back		
29.	" Battery Renewals " $ 24.89 " " "		
30.	" Tire Renewals " $ " " "		

IMPORTANT:—Be sure to carry out your figures into the TOTAL OPERATION column. Your *total* average cost per day and your *total* average cost per cwt. are as important as your period figures

CONDITIONS during the period were as follows:

APPROVED Mgr. CASHIER

Itemized list of all parts going on truck for this period and price of same.

Electric Truck Report Used by Sulzberger & Sons

days the vehicle operated, the number of pounds hauled, mileage, loads, pounds per load, miles per load and the cost per mile for gasoline or electricity. It will be seen by reference to the electric blank that the total cost per ton mile amounts to .0018 and that the gas truck cost but .0024.

These are very typical reports and it was astonishing to see how closely the reports, month by month of all these vehicles, coincide.

When questioned as to how it was possible for these trucks to show such uniformity in per ton mile cost, it was pointed out that they receive almost always practically the same loads so that they are operating under very similar conditions. In connection with loading, it may be mentioned that the shipper must hand in to the superintendent the actual weights put on each truck and any driver who persists in overloading the truck loses his job.

Typical Day's Performance

The following is a fair example of this work of one of the electrics. The vehicle in question was the General Vehicle No. 207. This car checked out at 2.45 A. M. with 7,000 lbs. of beef for the down town district, made eleven deliveries, covering eight miles.

The Garage

Sulzberger & Sons garage their own vehicles, using for this purpose a six-story building on East Forty-Sixth Street near First Avenue, less than two blocks from the plant. The first floor is the garage proper, while the second and third floors are for horses, the fourth for grain, while the fifth is the repair shop and the sixth floor is used for storage space. The repair shop is fitted with two drill presses, an arbor press, lathe, crane and a power hack-saw.

This company is now running about seventy-five wagons, requiring one hundred and forty horses in addition to the trucks, but this number is gradually being decreased as more trucks are installed.

The charging of the electrics is from current furnished from the plant, and on this account its cost is placed at but one cent per k-w, which is unusually low. The electrics are fitted with Gould, Helios and Philadelphia batteries. A competent repair man is in charge of all this work and a Simplex touring car is kept as an emergency wagon so that the vehicles are instantly looked after in case any trouble arises which the driver is unable to handle.

Repair Expense Items Gas Truck No. 211

Labor		$19.70
Material—		
1 Rep. Tail Lamp	$1.67	
1 ft. No. 16 R. C. Wire	.01	
1 Steel Bushing	.96	
6 Cotter Pins	.03	
3 Steel Bushings	.90	
		3.57
		$23.27
10 per cent. Battery Renewals		$24.89

Repair Expense Items Bar Truck No. 224

Labor		$64.92
Material—		
3 ft. 16 L. C. Duplex Wire	$.09	
6 1¾ No. 8 M. Screws	.06	
6 ¼ x ½ in. Bolts	.06	
1 lb. Brass	.28	
½ lb. Solder	.10	
4 ¼ x 1 in. Elec. Bolts	.04	
2 ⅜ x 3 M. Bolts	.02	
Misc.	9.50	
Breeze Carb. Co., 1 carb.	9.50	
Int. Motors, 2 under seat doors	6.50	
H. Lefrak, 1 light glass	.50	
		$26.65
		$91.57

the driver. Owing to lack of experience the troubles were naturally contributed to the vehicle; this continued for a number of months, and bills, outside of tires, amounted the first year to $510. By this time, however, the blame had been properly located and one of the old horse drivers, who had a bent for mechanics, was put on the machine and very soon became efficient. From that time on the repair bills began to drop off, although it was the second year for the vehicle and they might have been expected to increase. At the end of the second year it was found that the total expense for repairs and incidentals was only $100.

Vehicle No.	Out	Load	District	No. Del.	Mi. Trav.	Ret.
207	2.45 A. M.	7000	down town	11	8	6.15
	7.15	4800	uptown E. S.	13	12	10.30
			West Side	1		
			N. River			

This truck went out again at 11.45, with 3,000 lbs. of beef and made one delivery at the North River, where it picked up a load of 6500 lbs. of fat and hides and returned at 5.15, having covered 10 miles.

This driver is paid $22 per week; two of which is paid as an extra or bonus on account of his looking after adjustments, repairs, etc. This has worked out satisfactorily. The vehicle is operated on

Day's Record for an Electric

Vehicle No.	Out	Load	District	No. Del.	Mi. Trav.	Ret.
217	3 A. M.	7400 beef	down town	11	9	6.20 A. M.
	7.20	7400 bologne casings	Brooklyn	7	17	11.45
	2.30	2000 oil	B. & O. R. R.	1	5½	3.30 P. M.

A fair example of a day's long haul work for a gasoline machine is here given of truck No. 227 on Tuesday, 26th of August. This truck left the plant at 6.30 A. M. with 8600 lbs. of beef, small stock and provisions. The first stop was made at Mount Vernon, where several deliveries were made. The truck then went on to New Rochelle, White Plains, Rye, Harrison and returned at 6.45 P. M., having covered 63.5 miles.

Another truck, No. 225, left at 6.30 A. M. with 7500 lbs. of beef and small stock and made the run to Rockaway Park, where seven deliveries were made and returned at 3 P. M., having covered on this trip 64.6 miles.

Truck No. 224 left the same day at 2.15 A. M. with 7800 lbs. of beef, crossed over to Brooklyn, where three deliveries were made, and after having covered twelve miles, returned at 4 A. M.. It left again at 6.30 A. M. with 6,000 lbs. of beef and small stock and provisions for Rockaway Park. The round trip covered 64 miles, and the truck was back again at 6.30 in the garage.

The David Shannon & Company's Experience

David Shannon & Company, of 611 W. Fortieth Street, New York City, is a fair example of the use of a truck by a concern which caters to out of town trade. About two years ago this company purchased a four-ton Alco, and following the lead of many others, placed a chauffeur in charge. Trouble immediately followed, due to the inability of schedule time as nearly as possible, like a railroad train.

Mr. Shannon made the statement that on this long haul work, the vehicle was doing easily the work of three teams. The body is unusually well built, is of the closed type, the back doors of which can be unhung when not needed, about the same as window shutters.

Eighty-Mile Trips Come

David Shannon & Company handle small meats and deliver to the retail butchers. Practically all the loading is done at night, and when load is ready the truck is turned over to the driver, who starts, if a very long trip, quite early in the morning, four o'clock being a fair average time.

These long hauls take the place of former freight and express shipments, but as stated by others, Shannon & Company also find that meat gets to the customer in better condition, and it is able to guarantee delivery with the meats in as good condition as when they left the store. No refrigeration is needed, as the meats are placed in the vehicles cold and the closed in body keeps them cold. This method saves hauling at both ends, and as the customer would have to do the hauling when the meats arrived by railroad, he is very much better pleased when they come by motor truck.

David Shannon & Company finds the truck delivery cheaper than the railroad. The truck averages about fifty tons a week, figured on a basis of five days a week, and costs approximately $15 per day to operate.

UNITED DRESSED BEEF COMPANY SAVES FIFTY-FOUR PER CENT WITH COMMERCIAL CARS

Gas Cars Build New Trade and Supersede the Railroad

As with most New York meat packers, the United Dressed Beef Company, First Avenue and Forty-First Street, New York City, has found that an entirely new business has been created in the suburban sections, due solely to the use of gasoline commercial cars. This company now operates twenty-nine vehicles, both gasoline and electric. Electrics are of the General Vehicle make, and cover on an average of from forty to forty-three miles a day, in city deliveries. Twenty of these vehicles are employed and according to figures given by W. L. McCauley, General Superintendent, they are saving over 50 per cent. over the cost of hauling by horses in the same territory. It is almost impossible to compare the work done by the long distance gasoline machines with horse haulage, as horses could not cover the territory now daily served by the gasoline trucks. These trucks have been gradually put in service beginning with 1906, when the company operated 146 horses. At the present time only about 50 horses are employed, while the business has been enormously increased. When asked by the writer as to the future, Mr. McCauley said, "Even if trucks were more expensive, and some of the gasoline machines are on certain kinds of work, we could not think of going back to horses. We will continue to put on more trucks and use less horses."

Relative Cost Figures

This company is another which has kept accurate cost records. The gas trucks have replaced express and freight deliveries to nearly all suburban sections within a radius of thirty miles, and a new business has sprung up in this section, owing to the direct delivery of meats by trucks, deliveries being more prompt and the meat in better condition. With gasoline machines, the cost per 100 lbs., as shown by his records, figuring on 41 miles as the average distance traveled per day, is 16½c. or $.0804 per ton mile. As before stated this is not comparable with horses.

The work of the electrics, however, can be compared directly with horses; although each individual machine covers at least twice the distance that any one machine could travel in a day. The cost per 100 lbs. by electric vehicles figuring on an average of 19 miles is 7½c., or approximately $.0789 per ton mile. The figures on the horse delivery, per 100 miles, for 11 mile day, is 9½c., or approximately $.1728 per ton mile, thus a saving of over 54 per cent. is shown, by the motor driven vehicles over the horses.

The present equipment consists of twenty General Vehicle trucks, four Packards, and five Macks and two five-ton G. V.'s have just been ordered, which will make a fleet of thirty-one.

These trucks are as usual in this trade, loaded at night, the drivers being notified when to report, either by callers, by telephone, or are told the night before.

Special Men in Charge

This company maintains a completely equipped garage, 125 x 100 ft., four stories and basement on East Forty-Fourth Street. With such a large equipment trained men in their particular line are employed, and the vehicles receive the best of attention—the drivers having nothing to do but drive. The basement is used as a storage space, while the ground floor is the garage proper. Runways lead to the second and third floors, where horses are stalled, part of the third floor being a machine shop and battery room.

The cars are fitted with Gould, Philadelphia and Willard Storage Batteries. The bodies are of the closed type, and needless to say the equipment is kept up to a high state of efficiency.

Strauss & Adler Using Two Three-Ton Packards

The use of trucks is not confined alone to the large packers. The small stock men are also using motor driven vehicles. As an example of the successful use of such trucks, Strauss & Adler, 606 West Fortieth Street, New York, may be mentioned. Their two 3-ton Packards are continuously on the go, and are kept at the highest point of efficiency by competent drivers, who are paid $20 a week.

5170 1M. 5-22-13.

(THIS REPORT MUST BE SENT IN PROMPTLY AT EACH CLOSING DATE)

GASOLINE MOTOR TRUCK REPORT

*224 5 WEEKS PERIOD ENDING Aug 1 1913

Packing House / Branch House New York Make of Truck Mack Factory No. 828

Driver J Miller Capacity 4 Tons Date of Purchase May 24/11

		WEEKS PERIOD		WEEKS TOTAL OPERATION	
1.	Number of days operated	26			
2.	" hours "	131 45			
3.	" pounds hauled	260100			
4.	Mileage	1344			
5.	Number of loads	97			
6.	Average number of pounds per load	7029			
7.	" " miles per trip	36.			
8.	" " " per gallon gasoline	3.9			
	EXPENSES				
9.	Interest, 6% on $ 2113.49	17	15		
10.	Depreciation (See instructions)	67	70	(actual renewals)	
11.	Tire Depreciation (See instructions)	44	06		
12.	Minor Repairs to Tires, etc.				
13.	Fire Insurance, cost per year				
14.	Liability Insurance, cost per year	7	50		
15.	Labor (Driver and Helper)	90	75		
16.	Extra Help				
17.	Garage Expense	13	85		
18.	Gasoline 343 Gal. at 17 per gal.	58	31		
19.	Lubricating Oil 60# " at 34 "	20	16		
20.	Grease 5-5 Lbs. at 05 per lb.	2	75		
21.	Alcohol and Glycerine			(actual renewals)	
22.	Estimated Repairs and Yearly Overhauling	91	57		
23.	Miscellaneous, Licenses, Tolls, etc.	10	91		
	TOTAL EXPENSES	419	71		
24.	Average cost per cwt.		161		
25.	" " Ton Mile		0893	0024	
26.	Actual Repair Expense for Period $ 91.57 Itemized on the back				
27.	" Tire Renewals " $ " " "				

IMPORTANT:—Be sure to carry out your figures into the TOTAL OPERATION column. Your *total* average cost per day and your *total* average cost per cwt. are as important as your period figures.

CONDITIONS during the period were as follows:

APPROVED ..... Mgr. ..... CASHIER

Itemized list of all parts going on truck for this period and price of same.

Gasoline Truck Report Used by Sulzberger & Sons

These men are chauffeurs, but were previously employed in the meat business, so that they are familiar with all the requirements in this line.

The first of the trucks was put in service December 15th, 1911, and proved so satisfactory, that in May, 1912, another truck was purchased. Some of the old drivers were at first instructed in the operation of these machines, but as they did not pick it up readily enough the other men were hired.

Two Trucks Displace Fifteen Horses

Mr. Strauss states that these two trucks are displacing fifteen horses, and six drivers, and that they are saving money over the horse delivery, to say nothing of the increased business which has been acquired.

Contrary to the usual custom these trucks are not employed in suburban delivery, this company not catering to outside trade. The drivers do their own loading at night. If going to a comparatively distant point, they may start as early as eleven o'clock, returning at eleven or twelve the next morning, but for shorter routes, usually leave before one in the morning and are back before ten or eleven of the same morning.

Deliveries are made to retail butchers, this company dealing in veal, mutton and lamb.

The bodies are unusually well built, and are by George Irving Company, New York. They are of the required closed type, conforming to U. S. Government specifications. A novel feature of the construction is the fact that the bodies are enameled on the inside as well as on the outside. This greatly facilitates the washing out at the end of each trip, which is done with hot water. Clean long straw is laid on the floor before the meat is put in, and this is discarded at the end of each trip.

In July, a very busy month in this business, the two vehicles cost but $200, figuring in outside garage charges, gas, oil, etc., but not taking into consideration depreciation or driver's wages. The trucks average from 40 to 60 miles per day.

FLEET OF TWENTY-ONE TRUCKS USED BY NEW YORK BUTCHERS' DRESSED MEAT COMPANY

The fleet of this company consists of eleven electrics and ten gasoline machines. The electrics are all G. V.'s of 3½ tons capacity, except one which is a 5-ton capacity. The gas trucks are three 3-ton Packards, one 2-ton, and three Saurers of 5 tons capacity, one 3½ ton Reliance and two 3½ ton Frontenacs.

As with other packers, the electrics are covering the city hauls, but fifty-five horses being still retained by this company, while in 1907 one hundred and thirty-eight horses were employed. The gas trucks have replaced freight shipments, with the same advantages which have been previously mentioned, this company making a special point of the few handlings which the meat receives from the time it leaves the coolers of the plant until it is in the hands of the customer. Again the statement was made that the customer demands this prompt service, which can be given only by commercial cars.

Approximately the same methods are employed with drivers, with this company as with other large meat packing firms. At the end of each day's work which usually consists of two trips, the cars are driven into the Forty-First Street garage, where the straw is removed, and the cars cleansed with hot water from an enormous steam heated tub or vat. Drivers are expected to inspect their machines, but this is done under the supervision of a competent garage foreman. In this way the drivers are given the much desired instruction, and repairs and replacements have decreased since this system was introduced.

Recordografs are also used by this company on its trucks, not only on the motor vehicles, but also on the horse vehicles, so that every vehicle's complete record is known.

SWIFT & COMPANY USING FIVE GASOLINE TRUCKS

Most of the New York butchers are using a mixed installation of gasolines and electrics, but Swift & Company, according to statements by Superintendent Noyes, have employed thus far nothing but gasoline machines. These trucks have been in use for the past three years, caring for Long Island and up-State deliveries, practically all of the machines being used on long haul services, while horses cover the city within a radius of five miles of the plant. The equipment includes two 3-ton Frontenac trucks and three Packards. When questioned in regard to drivers, Mr. Noyes states that their experience had shown that it was best policy to educate their own men, rather than hire professional chauffeurs.

Railroad Shipments Replaced by Trucks

All of these vehicles are handling meat, which shipments were formerly made by express, to such points as Rockaway, L. I., and small towns in Jersey. Briefly the advantages are quicker delivery, no hauling at the start by the company to a railroad, and no hauling at the other end from the railroad by the receiver. Meat is received in better condition, especially in hot weather, goods always being handled by the packer's own men. In fact, Mr. Noyes said "we are forced to use trucks, no matter what they may cost, to keep up with the times, to compete with our competitors. Motor delivery is demanded by our customers."

Western Beef Packers Using Commercial Cars

THE successful operation of an automobile truck consists of more than simply purchasing the truck, placing a driver upon it and then telling him what you want him to haul and where it should be hauled to. That used to be the custom when the horse-drawn dray was more in general use than now. Men with just enough brains to pull on the gee line when they want to guide the off horse to the right, and sufficient sinew in their backs to lift a side of beef; some good strong teams and heavy drays were about the only requisites necessary to transfer the supply of beef from the packing house to the down-town distributing station. The person at the head of the department usually paid the expense bills each month—the feed bills, horseshoeing bills, etc.—and thought nothing at all about it. If a horse went lame for a week it was taken as a matter of course; for horses are expected to go lame occasionally or get sick. An extra horse, kept in the stable for that purpose and which ate as much bran and hay as the one which did the regular hauling, was placed in the lame horse's stead, and the meat hauling went merrily on as before.

If that same manager continues at the head of his department after a fleet of autos has been installed and a bill for the first month's gasoline comes in for his O. K. it gives him palpitation of the heart. If he continues to run the auto trucks in the same manner that he ran his horse drays and one machine chances to break a driving shaft and a pair of new tires are placed upon another in the same month, it runs his blood cold for fear the business manager will call him upon the carpet for undue heavy expenses. It is all because he knows no more about his auto trucks than he did about his horses.

It is the silly arguments of just this sort of man which go farther toward frightening the merchant who has not yet raked up the courage to give the auto truck a trial. This manager looks more to the effort to keep from spending money than he does toward attaining the highest point of efficiency. It is gratifying, indeed, to meet with a manager of a delivery department who keeps in touch with his auto trucks and knows what they are doing and how much they are saving him over the old system of hauling.

Packard Used by the Colorado Packing and Provision Company
One of a fleet of three cars used by this company. Commercial cars in this instance have reduced the cost of hauling meats from twelve cents per hundredweight as with horses, to seven cents

Such a man is Charles Gephart, who has charge of the auto trucks used by the Colorado Packing & Provision Company, of Denver. He keeps his records with accurate precision and is able to find at a moment's notice what each truck has done or is doing. He had previously been as alert in keeping his records under the horse-haulage system and can now compare the results of the two systems with an exact nicety.

Before his company installed auto trucks he had under his management 40 head of horses, 15 wagons and 27 men. It cost an average of 12c per cwt. under that system to transfer the dressed beef from the packing house to the city distributing stations—a distance of some 3½ miles. The first six months after installing the trucks and before discarding any of their horses the costs mounted to 16c per cwt. That was quite enough to discourage many a manager with a brave heart. But by the installation of three 3-ton Packards and slowly discarding teams and men and systematizing the operations of the trucks they have to date reduced the costs to 10c per cwt. Figuring on the trucks alone the cost still further reduces to slightly less than 7c per cwt.

To prove his figures he turned to his desk and produced a final report, properly filled out, on the first truck installed. The truck—a 3-ton Packard—was purchased August 30, 1910. It had been in operation up to July 1, 1913, a total of 82 weeks. In those 82 weeks it averaged 5 days a week, or 410 days of 9½ hours each, totaling 3962 hours in operation. It made 1120 trips between the plant and the distributing station, covering a total distance of 10,848 miles. It carried an average of 5143 lbs. per load, or 5,760,240 lbs. in all, and covered 4.38 miles per gal. of gasoline.

The expenses of the truck for the 82 weeks were:

Driver and helper ..... (There was included in this account a garage expense which ceased after a few months.)	$1,314.15
Tire expense	571.17
Gasoline	401.48
Lubricating Oil	61.48
Repairs and painting	567.80
Miscellaneous and care of engine	8.45
The total expense, including depreciation, fire insurance, etc.	$4,351.29

He figures the life of the truck at four years, consequently the depreciation must be placed at 25 per cent.

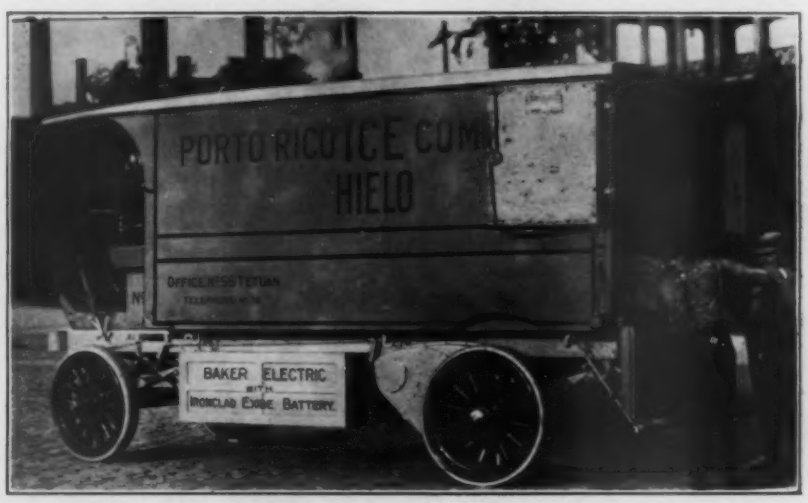
One precaution taken by Mr. Gephart, not looked after by all users of trucks, is the keeping of an extra front wheel and rear wheel complete, with tires affixed. If a truck slip a tire or break a wheel the delay is only long enough to shoot the extra wheel to place of accident, jack up the axle and replace the good wheel for the injured one, and the load proceeds without the necessity of having to transfer to another truck.

BAKER ELECTRIC FITTED WITH SPECIAL BODY FOR CARRYING ICE

On account of the torrid heat in Porto Rico and the long haul of six miles over which ice must be carried from the ice station to the sub-stations, it was necessary to have the truck body as near heat proof as possible so the following special construction was followed out. The side, front and roof are of double panel construction, 4 in. thick and all packed between the panels with cork. To withstand the intense heat from the ground, the floor is made 4½ in. thick and is built in layers. From top to bottom, these layers are 1 in. solid oak plank; 1¾ in. of asphalt composition; 1 in. of cork board; ¾ in. Georgia pine boards. The rear doors of the truck are regular refrigerator doors.

There are trap water outlets in the bottom of the truck which can be seen in the illustration. These outlets are so designed as to let water out and not admit air as a little water is always standing in the bottom of the trap. When the rear doors are closed this truck is a veritable refrigerator, practically air tight and will carry ice in hot Porto Rico many miles.

Inside the body are adjustable cross bars which can be put in against the ice to hold it from shifting while in transit, whether the truck is loaded full or not.



Baker Three and a Half Ton Electric in the Service of the Porto Rico Ice Company, Porto Rico

The Economic Delivery of Meats and Provisions*

By DAY BAKER

YOUR committee has complimented me by asking that I talk to you for a few minutes this evening on the most hygienic and economic means of delivering meats and provisions.

With the constantly advancing price of good horses, and the hay and grain required to feed them, to say nothing of the advances of wages required by the stable help, the more insistent calls of customers for prompt service, the greater distance to which it is necessary to carry your product, together with the strict sanitary rules which are now being enforced in most cities, it seems imperative that you adopt a more economic, reliable, speedy and sanitary method of delivery.

The cost of horses has steadily risen during the past ten years, and their food by leaps and bounds. If by any means we could utilize one-half the acreage now devoted to the raising of hay and oats for horses to the production of live stock for food purposes, think of the additional business it would mean to you, and the great good it would do the meat eating world at large.

The users of provisions, by which I mean the retail markets and the hotels, are calling for prompter deliveries, and more frequent service, which means more wagons and faster means of covering the ground. And, furthermore, the radius which every wholesaler and retailer is seeking to cover is being constantly increased, so the practical mileage obtainable by the horse, and the speed with which this mileage is covered is far from satisfactory, in addition to being very costly. The packers and wholesalers, if they are to keep their present fields and extend their deliveries, as it seems necessary to do, must for economy's sake, adopt some form of transportation more efficient than our good friend, the horse.

Testing Out Motor Trucks

The larger houses have for years been experimenting with various forms of motor trucks. Back in 1907, Schwartzchild & Sulsberger, at the Jamestown Exposition, at Norfolk, Va., put in service the first motor truck used for carrying meats, and strange as it may seem to many of you who have experimented with motor trucks, that original machine, an electric, is still in service in New York today.

Viewing horses, as we of the motor vehicle world would do, and as all of you interested in transportation soon will, it cannot be long before the consideration of motor vehicles will be actually forced upon you from an economic standpoint.

*Paper Read at Convention of United Master Butchers of America, August 12th, 1913.

Not only are horses themselves expensive, the food they eat costly, but the space that they and the wagons, feed, harness and manure occupy, costs money. This space, if added to your productive plant, would be bringing your income in place of expense.

Just compare the difference in space required for vehicles capable of carrying say five tons of meat over routes approximately say 30 miles.

	Sq. Ft.
The horse equipment would require space for two trucks..	240
Stalls for four to six horses..	160
Harness room	60
Hay, grain and bedding, storage	120
Manure storage	30
Total	610

As against this, an electric truck, which would easily do the same amount of haulage, would require only 160 sq. ft., which at one dollar per sq. ft. per year, the New York price, would show a net saving on space alone of $450 per year.

There is another point worthy of your most serious consideration.—the sanitary aspect. Think of the millions of flies bred in the barns that are after living on the filth of the stables, without wiping their feet, alight on your products and thus spread disease and death.

The Remedy for High Delivery Costs

As intimated before, the remedy for excessive cost of transportation, and relief from unsanitary troubles, is the motor truck. Motor trucks are constructed with two forms of driving power, gasoline engines and electric motors. The gasoline driven machine is adapted and works in its most economic field when used over long cross-country runs, where speed and distance are the controlling elements.

As high speed and long distances all add to the cost of deliveries, and as you all seek to sell and deliver goods in the most economic field, I am going to talk of the especial motor vehicle that will earn you the most money, by delivering the greatest amount of goods in the economical radius, with the least expenditure for maintenance, fuel and labor: The Electric Truck.

Referring to the five-ton unit, pardon me for calling your attention to a few figures, based on a 30-mile day.

Horses

Space (sq. ft.)	610
Space value	$2.00
Feed	5.00
Drivers	6.00
	$13.00

Electric

Space (sq. ft.)	160
Space value	$ .50
Electricity	1.00
Driver	3.00
	$4.50

These are only a few figures. It is safe to say that the two five-ton horse trucks, with all expense items considered, cannot be operated for less than $12.00 to $18.00 per day, with all expenses increasing, while the Electric Truck can be operated for $8.00 to $11.00 per day, and the price of big items like electricity, batteries and tires decreasing. Electricity was formerly sold for 10 cents per KWH. It can now be had for 1½ to 4 cents, in the larger cities. Tires have been greatly reduced in prices and can now be had guaranteed for 10,000 miles or eighteen months, while battery costs have fallen 220 per cent. in the past few years.

But you ask, do many packers and provision houses use electric trucks, and with what success? I shall assume that you all come from Missouri, and want to be shown, therefore, I have a few pictures which I will throw on a screen to give you some idea of the electric truck and what it is doing for the meat packer, provision house, and others who transport food products.

(Here followed 28 lantern slides.)

Electrics Popular Among the Trade

I will read you the names of a few of the packers, butchers and provisioners who have already from one to twenty-four Electric Trucks:

A. Sils, Inc., New York City; Sulzberger & Sons Co., New York City; John C. Roth Packing Co., Cincinnati, O.; T. M. Sinclair & Co., Ltd., Cedar Rapids, Ia.; Sulzberger & Sons Co., Chicago, Ill.; Swift & Co., New York City; United Dressed Beef Co., New York City; Charles Weisbecker, New York City; George Zehler Provision Co., Cincinnati, O.; Adolph Gobel, Brooklyn, N. Y.; Armour & Co., Chicago, Ill.; Armour & Co., New York City; Armour & Co., Philadelphia, Pa.; N. Auth Provision Co., Washington, D. C.; J. Hoffman Packing Co., Cincinnati, O.; Kingan & Co., Richmond, Va.; Kingan & Co., Washington, D. C.; Kingan Provision Co., Cincinnati, O.; Krey Packing Co., St. Louis, Mo.; D. B. Martin Co., Philadelphia, Pa.; John Morrell & Co., Memphis, Tenn.; John Morrell & Co., Ottumwa, Ia.; N. Y. Butchers Dressed Meat Co., New York City; George A. Hart, Essex, Mass.; Philip Ohl, New York City; Charles Roesch & Sons, Philadelphia, Pa.; Otto Stahl, New York City; William Volker Co., Kansas City, Mo.; Richard Webber, New York City.

It may interest you to hear a report which we have just received from the

3½-ton truck in the service of Sulzberger & Sons, Chicago:

This truck went into commission on November 30th, 1910, and had covered 9421 miles to November 30th, 1911. During this period the truck has been in service every working day, making deliveries of meat to downtown points in Chicago and to such suburban points as Oak Park, Kinsington and Dunning. The average load carried was approximately the rated carrying capacity of the truck.

During the very hot weather this truck was performing the work of three teams covering anywhere from 45 to 55 miles. The driver states that he had no difficulty at all in making 45 miles, and picked out the following figures—49, 50.1, 52.4, 55 and 59, respectively, as proof. The only expense which they were put to during this interval was the renewal of tires after approximately 7000 miles of service and the renewing of the Morse chain.

You will note that many of the leading packers are already satisfied that the electric truck has a very important part with the economical transportation of meats and that the retailers are rapidly following their lead. The results justify this. The Krey Packing Company have operated electrics since 1906, and one of their trucks was built in 1904. All the six electrics used by John C. Roth were built before 1907; all but one, in fact, in 1905. You see, men like these don't have to guess about a high grade truck lasting long enough to allow them to get their money out of it,—they know. You can be just as sure that a high grade electric will bring you in dividends the horse could not do in a lifetime.

Motor Delivery the Way of the Future

The richest rewards of enterprise go to the man who is just a little ahead of his time. The prophet two hundred years ahead of his time was burned to the stake, but the Wright Brothers, who were only five years ahead of their time, reaped honor and profit. It pays to do the thing which the people at large vaguely feel, but do not clearly see.

In the near future, our motor driver age will look back upon the horse, as we now regard the belated ox; while a cleaner and more humane period than ours will wonder at the contagion and death we permitted the horse and his ally, the fly, to distribute.

The present cannot continue indefinitely to be under the domination of the past. The streets filled with slow horse-drawn vehicles must become the smooth highway of the silent and swift rubber tires, motor wagons and trucks.

Genius has entered the motor against the quadruped, and all who have witnessed the triumph of the inventive mind over the clumsier resources of animal strength will realize that the horse must make way for the motor; for science and engineering skill are greater than brute force, and the electric truck is here.

Here Mr. Baker exhibited by stereopticon some 60 lantern slides, showing upwards of 90 trucks used in the meat packing and provision carrying business.

Butter and Egg House Increases Volume of Business Through Use of Trucks

Trucks Permit Development of Business in Distant Towns—Are Great Business Advertisers

P. F. BROWN & COMPANY, of 39-43 South Front Street, Philadelphia, dealers in the famous Gurnse butter and Milhen Farm eggs, well-known products in the vicinity of Philadelphia, are one of the largest users of trucks in this particular line of business. Not only does this company employ more commercial cars than any other butter and egg house, but it is a firm and enthusiastic believer in them, and gives the commercial car due credit for the great expansion in business which has developed since it began using trucks.

Mr. Brown, in speaking of the advantages of this mode of transporting goods, said: "It would be simply impossible for us to take care of the business that we are now doing if it were not for the commercial car. We have extended our territory into distant towns in New Jersey, such as Bridgeton, Millville, Vineland, Salem and other cities which are from fifty to sixty miles from Philadelphia. Without the trucks it would be absolutely impossible for us to cover this outlying territory on a paying basis."

This concern operates a variety of cars, as follows: three Autocars, one Packard, one White, one Bergdoll, two Flanders, one G. V., one C. T. and one Cadillac. The latter is a converted touring car. These cars are all systematically inspected every ten days or so, and the company operates its own machine shop, which is conducted under a competent repairman. No special record system is employed in the shop, duplicate tags, however, being used, one of which is attached to the steering wheel of the car that needs repairing, while the other half is placed in the office and a record kept of same. The foreman of the shop keeps a complete record of all the repairs made on every car, and in case any par-

C. T. Electric Used by P. F. Brown & Company, Philadelphia
This car displaces two teams and, like the other electrics in this company's service, is used principally for short hauls and city work

ticular car appears to be developing a weak point, a memorandum of this is made and a date set for repairing the truck. Any possible breaks or repairs are thus kept under surveillance, and thereby a complete breakdown is avoided. Every repair item is charged against the truck in question, and a record of all of this is kept in the office. The repair shop is run entirely separate from the rest of the concern's business, and a certain amount of money is deposited in bank to take care of all repair work and breakdowns which are liable to occur throughout the year.

Mr. Brown favors the electric truck for his business, especially for the city work. However, for the long hauls the gasoline machines are used. When this firm first started in to use trucks it employed thirty-six horses, which number has now been decreased to twenty-two, supplementing the twelve commercial cars now being used.

For Philadelphia territory three electrics are constantly being operated and it is the intention of this concern, as soon as conditions warrant it, to put into operation five or six additional machines.

The proprietor of this concern believes in system and in having careful records kept of the movements of each vehicle. Therefore all records of the trucks used are made by the Recordograf supplied by the Philadelphia Supervision Company, which instrument is described on another page in this issue. The paper tapes are taken from these instruments every night and deposited on Mr. Brown's desk next morning, so that in this way the proprietor himself knows to a fraction of a mile what every truck has done the day before.

The Office Record

In the office a complete record is kept of each and every truck for every day it is in operation. One of these records is reproduced herewith, and shows how the various items incidental to the use of the truck are taken care of. The cars, for convenience's sake, are labeled according to the alphabet. The record here reproduced is that of a White car for April 30, '13. The amount of gasoline, lubricating oil; the time the car left the garage and when it returned; the miles traveled; tire changes or repairs are all noted in the column on the left. The total running expenses per day are carried to the column on the right, to which are also included insurance at 50 cents, and depreciation at $2 a day is added to the cost of running the truck up to the twenty-fifth working day of the month of April, making a total cost of $180.43 up to the twenty-sixth day. In the right hand column is also figured the total amount of gas consumed by the truck for the number of working days in the month, as well as the total mileage, which in this case was 1537½.

The cost per mile for each day is also figured, this figure varying of course with relation to the amount of repair work done upon the truck in question. These records are kept in a loose-leaf binder, and at the end of the month are stored away for reference. The total amount of each month's work for each truck is recorded in a ledger, so that the total expense of the truck for a year can be quickly figured out.

This concern does not use any specially designed bodies, the regular closed panel body and express types being used. In case a load of eggs is hauled, the crates or boxes are piled in the truck four abreast and held tight by wooden wedges which are stuck in between each row of crates. The use of trucks has not occasioned any more breakage in eggs than is the case with horse-drawn equipment.

P. F. BROWN & CO.—Commercial Truck Record

CAR NO. J CHAUFFEUR Krauss DATE 4-30-13
MAKE White SALESMAN "

| | | |

Delivery Department Losses Turned Into Dividends

Ingenious Mechanical Device Shows Up "Leaks" and Inefficient Methods

BY furnishing a complete record for every minute of the day of the movements of the vehicle to which it is attached—as well as the time and duration of every stop—a little instrument called the Recordograf, which has come into extensive use recently, has put numbers of dishonest drivers out of business and stopped many a "leak" in the delivery systems of numerous firms. This instrument is the invention of Edward A. Henkle, a celebrated mechanical genius of Philadelphia, and by its use losses in the delivery department are turned into profits. Attached to any kind of wheeled vehicle—horse-drawn or motor, truck, taxicab or pleasure car—it accurately records on a paper tape (1) the time of starting on the run; (2) the time of return; (3) the distance covered during the day and between any given hours; (4) every stop made during the day; the time each stop was made and its duration; (5) the various speeds attained during the day and the speed at which the vehicle was moving at any particular moment. All these things are recorded more faithfully and accurately, and the owner given more information about the movements of the vehicle than would be possible even if the driver were accompanied every day by a watcher.

Thus it can readily be seen that, when the little automatic detective is on the vehicle, all time wasted by a dishonest driver can be easily discovered and all the little tricks by which employers are defrauded can be done away with.

The mechanism of the instrument is simplicity itself. A tape about twice the width of regular ticket tape is ruled off with vertical lines. The space between these represent fifteen minutes of time.

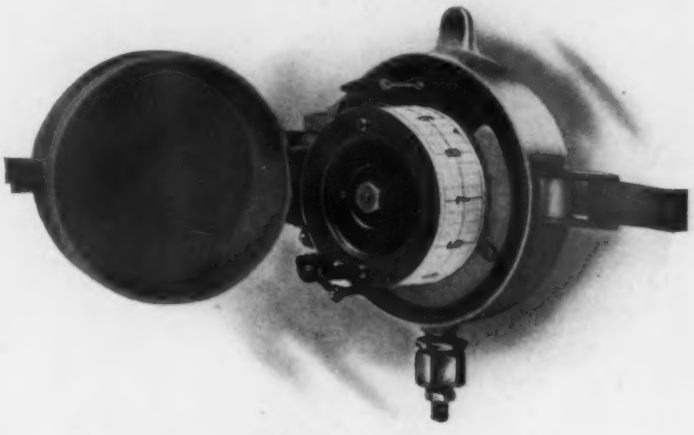
Spaces between horizontal rulings on the tape represent quarter miles. A most ingenious clock work arrangement moves a pointer over the tape. When the vehicle is standing still the pointer makes a straight horizontal line. When in motion the connection by flexible shaft with the wheel working in conjunction with the clockwork moves the pointer up and down and along the tape according to the speed. By tracing the record over the horizontal and vertical lines the exact speed at which the vehicle was moving at any time can very readily be seen.

Experts from the Delivery Supervision Company, which is marketing the device, change the tapes or records daily. The tapes are then gone over carefully, full deductions made, speed and mileage, etc., computed by trained men, conduct is calculated and a complete report made to the owner without any possibility of the interception of the information by an interested employe.

The Delivery Supervision Company's mechanics who operate the service are compelled, under penalty of immediate discharge, to render a record daily from each vehicle equipped. The time at which the tapes are removed and new ones substituted is automatically recorded on the tapes, and in that way a perfect check is kept upon every minute of the vehicle's time. So complete, in fact, is the story told by the Recordograf that the movement of the vehicle across the floor of the garage to the washing stand is shown on the record.

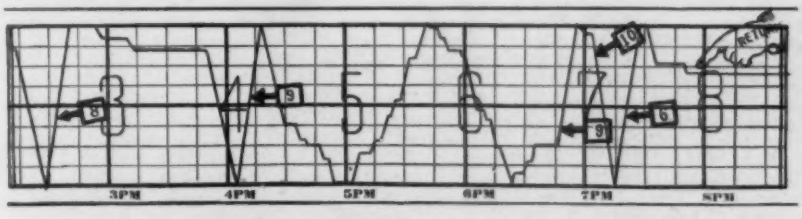
The instrument is locked with a specially designed lock, and keys are issued only to the Company's experts, so that drivers may not tamper with the mechanism. The Company leases its instruments to its clients, at a charge varying with the number of machines installed, and, as its name implies, supervises the whole delivery system through its own experts. The Company's headquarters are in the American Taximeter Building, 735 7th Avenue, New York City. Branches are operated in Boston, Philadelphia, Chicago and San Francisco. In territory not reached by any of the Company's branches, the Recordograf is sold outright.

Another good feature of the service is the agreement, without added expense to its client, to give expert testimony in court whenever requested to do so by a client, as to the speed with which the vehicle was moving at any particular time. This has proven a most useful function, and the testimony of the tape has proven invaluable in many cases, and has been accepted in court over the word of witnesses. There have been many cases in the experience of the Company in which the record on the tape alone and unsupported has saved clients heavy damages. Only recently a department store delivery wagon ran a man down as he was crossing the street, injuring him severely. He sued the store for $25,000, alleging the wagon was going at a speed of thirty miles an hour. Several witnessed that the car was making high speed. The record for that vehicle as given on the tape produced in



The Recordograf

An instrument which, applied to any vehicle, records its every movement: time of starting, stopping, duration of stops, speed and distance traveled



Part of a Day's Motor Truck Record

Pencil lines crossing the tape at whatever angle, indicates that the vehicle was moving. Where the vehicle was moving at a high rate of speed, the index hands are stamped, and the figures in the hands donate the rate of speed in miles per hour. When pencil lines run lengthwise with the tape, stops are shown. The printed figures on the tape represent the time of day, and the spaces between the cross lines (between the figures) represent fifteen-minute divisions. The entire width of the tape represents two miles.

court, showed that at the particular moment of the accident the car was making but five miles an hour. The case was immediately thrown out of court.

Within a very short time after the equipment of vehicles with the Recordograf, it is found that drivers and chauffeurs are trained to moderate speeds and accidents become fewer and fewer.

Installation of these instruments on fleets of vehicles has revealed the most astonishing condition of affairs in the delivery system. Officials of companies have been amazed to discover the losses

Collecting the Tapes

Collector taking a tape from a vehicle in the garage. Note collected tapes at waist and new tapes on spools resting on bumper. All this is done at night, by miner's lamp on cap. Note battery for this light on the belt at his back.

at which their delivery departments were being operated. Clever tricks of drivers to defraud their employers have been uncovered. Even when confronted with the direct evidence from the tapes many merchants have been reluctant to believe that such a condition could exist.

The proprietor of a big Philadelphia establishment which has a complete equipment of this instrument, says that it saved him more than $100,000 in his delivery department during 1912. It is not at all to be wondered at that merchants cannot believe that such a big leak is possible. He has to be shown and he is invariably convinced.

Here are typical causes of leaks. Tapes from instruments on four vehicles operated by a Philadelphia house showed a stop of an hour and a half every morning about four miles from the store. Investigation disclosed that the drivers were in the habit of going to the store without having breakfasted, and then, having started out, would enjoy a leisurely meal in the Company's time.

Another vehicle, horse drawn, was found to be making no stop at the luncheon hour. The driver was followed up and found to be regularly selling the horse's oats.

Numerous instances of this nature are in the records of the Delivery Supervision Company.

CLEVELAND USES PEERLESS CARS IN ITS FIRE DEPARTMENT

In order to be modern and to give its citizens the necessary fire protection, which horse-drawn equipment through its slowness could not render, the city of Cleveland, O., some time ago, took steps towards motorizing its fire department by placing in service a flying squadron wagon, carrying hose and chemical tank equipment. This machine was a six-cylinder Peerless chassis, shown in one of the accompanying illustrations, fitted with a combination hose and chemical wagon body. Its service proved entirely successful and in addition to ordering duplicates of the car, the city of Cleveland placed a block order for $25,000 worth of Peerless apparatus. This order called for: High pressure hose wagon, of 3000 ft. capacity; a hook and ladder truck, two flying squadron wagons, and a combination hose and chemical wagon.

The six-cylinder cars of the fleet are equipped with a mechanical starter, Gray & Davis lighting system, searchlights on the dash, and Kellogg mechanical tire pump. The equipment consists of one 35-gal. Halloway chemical tank, with valves, gages, etc., connected with a hose reel carrying 200 ft. of 1 in. chemical hose; two 3-gal. portable chemical tanks on running board, two pick-head fire axes, two 9 ft. pike poles, one 24 ft. extension ladder, one 12 ft. roof ladder, one crowbar, one battering ram, two fire department lanterns, hand-operated bell, and one emergency stretcher.

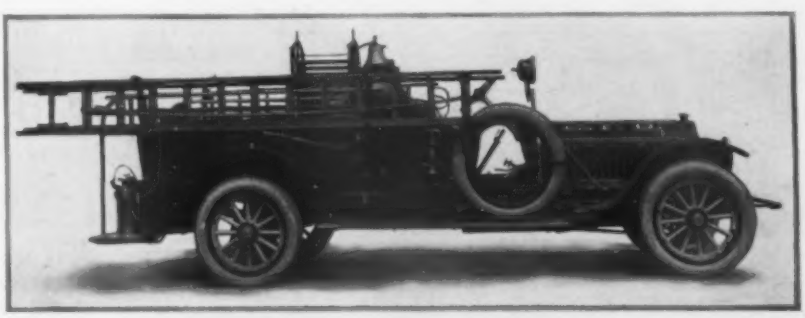
The high pressure hose wagon is equipped with a steel body, which has a carrying capacity of 3000 ft. of high pressure hose. There are compartments on each side of the body for fire equipment. A large wire basket directly in rear of the driver's seat contains play pipes, nozzles and other special equipment. On the rear there is a large life net box, two 5 gal. Babcock fire extinguishers, two pick-head fire axes and two crowbars. This apparatus is equipped with Gray & Davis electric generator outfit and includes two electric searchlights, one electric dash searchlight and one electric tail light. This wagon is equipped to carry a crew of fifteen men and has a maximum speed of 35 m. p. h.

The hook and ladder truck, which is 50 h. p., 205 in. wheel base, has a carrying capacity of 3 tons, and carries the following equipment:

Fifty ft. extension ladder, two 31 ft. straight ladders, 25 ft. straight ladder, 20 ft. straight ladder, 18 ft. straight ladder, 16 ft. straight ladder, 14 ft. straight ladder, 14 ft. roof ladder, stationary hooks, 12 ft. extension ladder, two 10 ft. pike poles, two 9 ft. pike poles, two 8 ft. pike poles, a 6 ft. pike pole, a 4 ft. pike pole, a 5 ft. crowbar, a 40 in. crowbar, two 7 lb. pick-head fire axes in brass holders, two shovels, two pitch forks, two 5 gal. Babcock chemical tanks, four fire lanterns, a door opener, a wall pick, a tin roof cutter, a battering ram, an insulated wire cutter, 175 ft. rope and block, and a 12 in. bell. This truck is also equipped with a Gray & Davis electric generator outfit, the same as on the hose wagon.

MOTOR TRUCK VS. TRACTION ENGINE

Large capacity motor trucks equipped with power operated dump bodies and loaded by steam shovels are being used in increasing numbers all over the country for the excavation and the quick transportation of gravel and earth. The Dale Engineering Company, which has a contract for constructing gravel roads near Auburn, N. Y., recently placed a four-ton truck with a screw power hoist dumping body in competition with a steam traction engine for carrying gravel from the pits to the road. The gasoline truck carried its full load and pulled after it a very large trailer loaded to capacity. The gravel taken at each trip amounted to nearly nine tons. The destination was a trifle more than three miles away and the truck averaged ten trips in a working day of ten hours. In other words it delivered over 90 tons of gravel to the road builders every day. Three trailers were used with the traction engine and they carried 12 tons of gravel. The engine was, of course, much slower than the truck. Its regular speed is two m. p. h. It delivered 24 to 36 tons a day, but slow as it is, its use is considered economical as compared to the employment of animal drawn vehicles.



One of the Flying Squadron

This was the first type tested by the department. It is a six-cylinder car, has electric lights and a mechanical starter

Motor Truck Design and Construction Made Plain

Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is the second installment of a series of articles by this well-known writer, covering in a nontechnical way the various constructions now current practice in commercial car design. These articles will take up, in order, the general types of chassis, the advantages and disadvantages of each, illustrated by simple diagrams, and in logical order, motor construction, ignition, carburetion, cooling, lubrication, etc., until each part of the truck has been dealt with.

PART II.

TWO AND FOUR-CYCLE MULTI-CYLINDER MOTORS

BEFORE taking up the discussion of function of two and four-cycle motors, it may be well to first consider the definition of the term "cycle" as applied to gasoline motors.

This term is defined as the cycle of operations or, in other words, the successive actions of the working fluid of a heat engine upon the piston and of the piston upon the working fluid commencing when a certain relationship between the two exists and ending with the next recurrence of the same relationship; or, in other words, any series of events occurring in succession, which goes to make up a complete operation.

There are four things which must occur in an engine cylinder in succession before it can repeat. As soon as the explosion occurs, the gas must expand which forces the piston down to the end of its stroke. Upon the completion of this stroke or the next up stroke the spent gases must be gotten rid of by forcing them out of the cylinders; then a fresh charge must be drawn in and compressed before the explosion again takes place.

This series of operations is termed the cycle of operations. There are two types of gasoline motors, one comprising that type which has a power stroke every revolution, which is termed the two-cycle or two-stroke type, and the other which has a power stroke every other revolution, termed the four-cycle or four-stroke type.

The Two-Cycle Type

As mentioned above, the characteristic feature of the two-cycle motor is that there is an explosion every revolution on the down stroke of the piston. Another feature of this type of motors is that the gas must be precompressed, which is generally accomplished by admitting it to the crank case before it reaches the cylinders.

There are two general types of two-cycle motors, known as the two- and the three-port types, so called, by the number of parts in the cylinders, which permit gas to enter and to escape after combustion. The three-port type is mostly used in automobile work, while the two-port type is strictly a low-speed motor and best adapted to marine work, where speed is a minor consideration. In depicting the operations of a two-cycle motor, the three-port type will be considered, as it would be useless to use considerable space on a subject which is of no interest to us.

In four-cycle motors the four events mentioned above, i. e., ignition, exhaust, intake and compression, take place between the piston head and the head of the cylinder, but in the two-cycle type the crank case is made air tight and performs part of the work of getting the gas ready to ignite.

The successive operations of the two-cycle motor are as follows: While the piston is traveling upward in the cylinders it creates a partial vacuum in the crank case, and when it reaches a certain point it uncovers the intake port "A" in the walls of the cylinder, through which, by reason of this vacuum, it permits a charge of gas to enter the crank case from the carburetor. This stroke is illustrated in Fig. 1, while Fig. 2 depicts the next down stroke of the piston. During this down stroke, the charge is partly compressed in the crank case. As the piston reaches the bottom of its stroke, it uncovers the port "B" in the cylinder wall, which communicates with the crank case and is called the transfer port, thus permitting the charge in the crank case to enter the cylinder. Shortly after the piston starts on its up stroke it closes this transfer port, and during the remainder of this stroke the charge is compressed within the cylinder and as it reaches the top of its stroke the charge is ignited, expands and forces the piston downward. As the piston reaches the bottom of its stroke the exhaust port "C" is opened, and the spent gases which are still under considerable pressure escape through this port. This exhaust

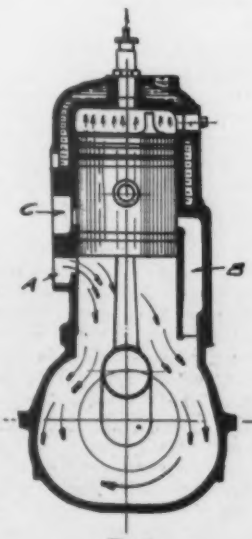


Fig. 1.
Crank-Case Inlet and Cylinder Compression

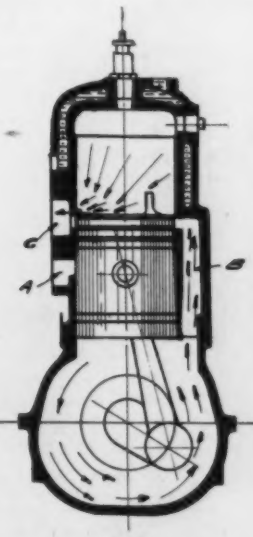


Fig. 2.
Expansion and Exhaust

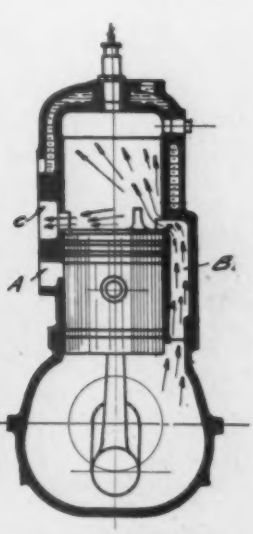


Fig. 3.
Exhaust and Transfer of Gas

port opens a trifle earlier than the transfer port, permitting considerable of the spent gases to escape before the fresh charge is admitted to the cylinders. This is illustrated in Figs. 2 and 3. It is, of course, impossible to completely scavenge the cylinders and prevent the fresh charge from escaping through the port "C;" however, the piston has a deflector "D" which is intended to deflect the incoming gas upward and reduce the loss to a minimum. This deflector must be placed opposite the exhaust port.

From the above we can readily understand, that when the charge is being compressed in the cylinders on the up stroke of the piston and before ignition takes place, a fresh charge is permitted to enter the crank case and when ignition takes place the gas expands, forcing the piston downward and nearing the bottom of its stroke it uncovers first the exhaust port, permitting a good quantity of spent gases to escape and then uncovers the transfer port, permitting a fresh charge to enter the cylinder, after which compression within the cylinder again takes place, thus completing all four operations in one revolution of the crank shaft or two strokes of the piston, crank case intaking and cylinder compression on the up stroke, expansion, exhaust and transfer of charge from crank case on the down stroke.

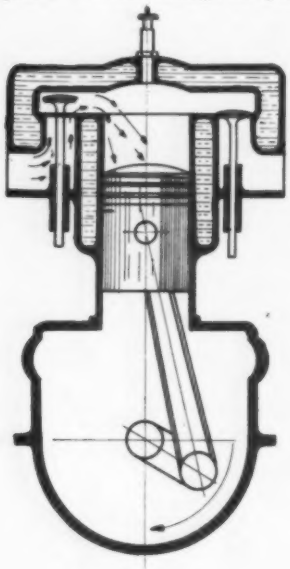


Fig. 4
Intake Stroke

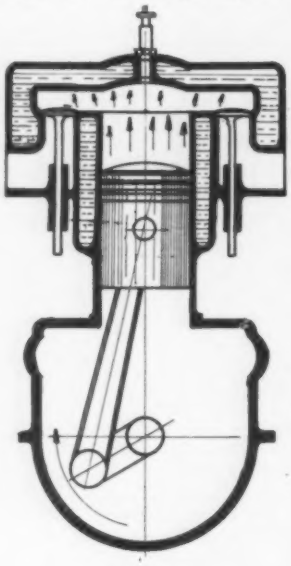


Fig. 5
Compression Stroke

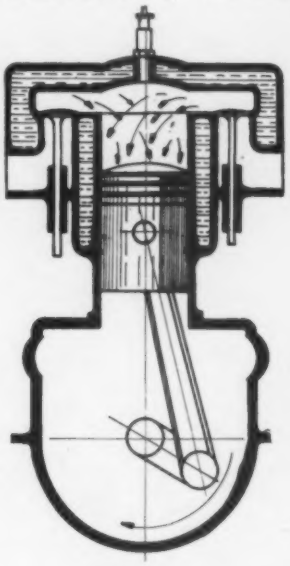


Fig. 6
Power Stroke

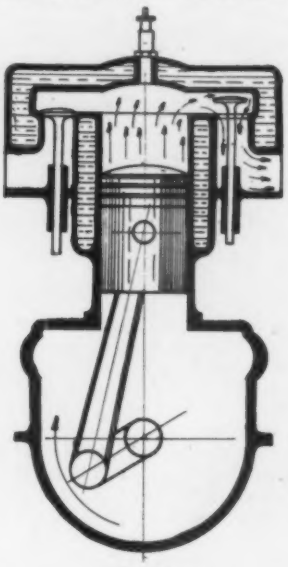


Fig. 7
Exhaust Stroke

The Four-Cycle Type

The same operations occur in the four-cycle type of motor; however, they require two complete revolutions of the crank shaft or four piston strokes. This comprises the following operations as mentioned below:

First: Admission of charge to the cylinders.

Second: Compression of charge within the cylinders.

Third: Ignition and expansion of charge.

Fourth: Exhausting spent gases.

In four-cycle motors the inlet and exhaust of the charge is entirely controlled by valves instead of the piston and ports in the two-cycle motor. During the past few years numerous types of valves have been used, such as the piston type, which may be compared with a small piston opening and closing the ports at the proper time, sliding sleeve, operated on the same principle, and poppet valves which are opened by a cam mechanism. The sleeve and piston valve motors have been experimented with for pleasure car work; however, in commercial cars poppet valve motors have been exclusively used in this country, and the writer will confine his discussion to this type of four-cycle motor. As mentioned above, the first stroke of a four-cycle motor is the admission or intake stroke.

The piston travels downward in the cylinder and at some point in the wall of the combustion chamber an inlet valve is located, which at the proper time opens and places the combustion chamber in communication with the carburetor (see Fig. 4). As this valve opens the piston has moved downward a short distance, and a vacuum has been formed with the cylinder which creates a suction and permits the charge to enter. These valves were formerly operated by this vacuum within the cylinder and a light spring to close them when suction ceased. This type was known as the automatic intake valve, but was discarded some time ago, as it presented numerous disadvantages. At the present time mechanically operated intake valves are used, which are positively opened and closed by mechanical connection with the motor crank shaft at the proper time.

This valve remains open until piston has passed the bottom of its stroke, and shortly after the piston has started on its up stroke it closes and remains closed during the completion of this up stroke. During this up stroke the charge is compressed within the combustion chamber (which is sometimes termed the compression space) and prepared for ignition.

So far the piston has made two complete strokes, and the crank shaft one complete revolution, while two operations have been completed within the cylinders, this second operation being shown in Fig. 5.

Upon the completion of the compression stroke the gas is ignited by introducing an electrical spark to occur within the combustion chamber. When the charge is ignited the pressure rises to between four or five times what it was previously, causing the gases to expand and thus forcing the piston downward and converting the heat of these gases into useful energy or power. This stroke, known as the power stroke, is illustrated in Fig. 6.

When the piston reaches the bottom of its stroke the exhaust begins to open and the spent gases escape rapidly. This exhaustion of spent gases continues all through the following return stroke of the piston, the valve remaining open until the piston has again moved downward a slight distance and then both valves remain closed for a short period to create the vacuum which causes the suction of gases from the carburetor on the intake stroke, and permitting the motor to again resume its cycle of operations.

The exhaust valves are always operated by mechanical connection with the motor crank shaft, similar to the intake valve; however, their timing is different, as they must remain open longer than the intake. In two-cycle motors the exhaust and transfer ports must be placed opposite each other; however, the valves of the four-cycle type of motor may be placed in various positions, as both valves are never open at the same time. Fig. 7 clearly illustrates this point.

The exhaust valve is shown open and the piston is traveling upward, while when the intake valve is open the piston must travel downward.

In presenting these illustrations the writer has depicted valves on both sides, so as to simplify the illustrations as much as possible. In the various motors the following valve arrangements may be found: The valves may be on opposite sides of the cylinder, which is called the T-head type, while in others they are located side by side, and known as the L-head type; they are also located in the cylinder heads, and by combination of one valve in the head and the other in the side; however, the first two are the most popular types.

Advantages and Disadvantages of Both Types of Motors

In the two-cycle motor we find that both the exhaust and transfer ports are open together for certain periods, and it can readily be understood that since we are performing the four operations in two strokes of the piston, the time required for each operation is limited, It was also stated that the exhaust port opened slightly before the transfer port and that a fresh charge was admitted before the spent gases had entirely escaped. From this we can assume that all the spent gases do not escape and that there is a possibility of part of the fresh charge escaping through the exhaust port, and the fresh charge becoming deluded with the spent gases which do not entirely escape. In comparing the exhaust and intake periods of both types of motors, we find that these periods cover but approximately one-half the time in two-cycle motors than in the four-cycle type. The combination of these operations and the short periods naturally permit of less fuel economy in the two-cycle motor. That considerable fuel is wasted has been proven by exhaust gas analysis on numerous occasions.

In the four-cycle type we get a greater charge in the cylinders due to the longer period, as one complete stroke of the piston is required and this is maintained during the compression stroke as both valves remain closed. This is of great importance in high-speed motors, as even with the long periods intake becomes very short when the higher engine speeds are reached and much less gas enters the cylinders. Even in lower engine speeds it presents advantages. The cylinder also maintains its full volume until after combustion occurs and the exhaust gases are forced out of the cylinder by the return stroke of piston, during which time the intake valve remains closed and no dilution of gases occurs. Of course, some spent gases remain in the cylinders of a four-cycle motor; however, the quantity is much less and does not have much effect on the next fresh charge.

There is also considerable power loss in two-cycle motors, due to leaky pistons, crank case joints and cylinders and bearing journals. This is of considerable importance, as the gas is partly compressed in the crank case and can escape through the exhaust port, should the rings leak or through the various joints, should they not remain air tight.

In four-cycle motors power is lost through leaky pistons and valves; however, it is not as great and is of little importance as the engine will continue to run and develop a small amount of power. This is not the case with the two-cycle, as in the first place the fresh charge is somewhat limited and, second, it can escape before it reaches the cylinder, sometimes causing complete stoppage of the engine.

Leaky valves can readily be reground at a small cost with dismantling the engine, while to eliminate leaks in the two-cycle means complete dismantling which is an expensive item, as new bearings must be provided in case they permit gas to escape, it being impossible to adjust them with shims and retain an airtight case. Crank case leaks are also of serious nature, as the motor must be dismantled in order to replace the gaskets at the various joints. Replacing rings is probably of equal expense in both types.

The manufacturing cost is lower in the two-cycle type, while it is also somewhat more simple, due to the absence of the valves and their operating mechanism. As there are fewer parts and the limitations of their proportions also means lower weight per horse power for the two-cycle type, and it is also claimed that they develop somewhat more power and have a better mechanical balance. However, these features are obtained at considerable expense in maintenance and it would seem that the logical commercial car motor is one which provides the lowest maintenance cost in proportion to the work done, which refers to the four-cycle type. This can readily be proven by citing the large number of four-cycle motors used in commercial cars, especially the heavier types, two-cycle motors being mostly used on the popular priced commercial cars of 3,000 lbs. capacity and under.

The four-cycle motor also has its disadvantages, being more complicated, more expensive to build and perhaps its weakest point is the valves; however, they are readily accessible, and do not mean much expense in regrinding or replacements. Leaky inlet valves alone permit the diluting of the charge with spent gases and indirectly reduce the power of the motor. The valve operating mechanism of course is a source of complication and expense and would be eliminated if this could be done without too great a sacrifice in other directions.

It is also a well-known fact that carburetion is more difficult in the two-cycle motor, which may be due to the fact that the suction of the carburetor is more rapid and uneven in this type than in the four-cycle type.

Two-cycle motors also require considerable more lubricating oil and can not be lubricated by splash, owing to crank case compression. Forced lubrication from an outside source must be used. While the two-cycle engine has been built for the past twenty or thirty years, it has not been deemed worthy of the serious attention of many engineers, and it has not yet reached anything near the standardization and perfection of the four-cycle engine.

Multicylinder Engines

For small moderate powers a single cylinder engine possesses the advantages of the simplest possible construction, inexpensive to manufacture and maintain, and more economical in the use of fuel. Along with its advantages, however, it possesses two inherent defects, particularly from the standpoint of its use in commercial cars, for which reason it is now seldom employed. In discussing the cycle of operations it was stated the power impulses were irregular, due to the fact that a power stroke occurs every other stroke, or every fourth stroke and that the gases which are compressed in the cylinders, require a certain portion of power to accomplish.

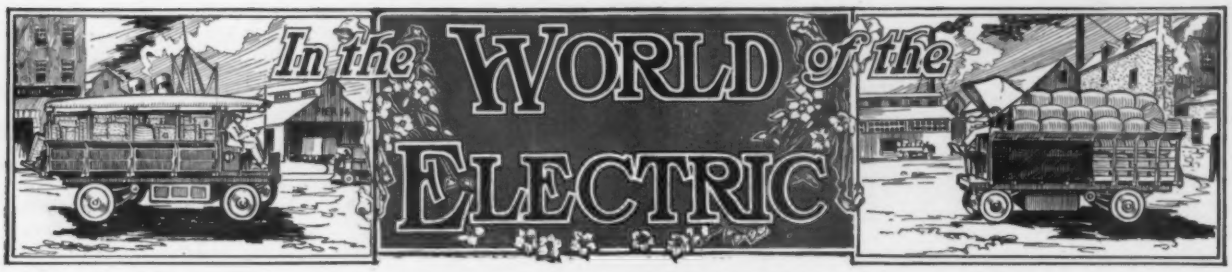
Therefore, in order to keep the engine running at a fairly uniform speed against a nearly constant resistance it is necessary to employ a heavy fly-wheel in which some of the energy liberated on the power stroke can be stored, to be given out again during the idle strokes.

A single-cylinder motor is sadly lacking in mechanical balance and the vibrations are great. These vibrations are due to the reactions of the explosion and inertia forces. In a single-cylinder motor the entire reciprocating mass (i. e., the piston with its parts, the connecting rod, bearing and crank pin), is in a single unit and the reaction of the inertia force of the parts produces a strong vibrating effect, while in multi-cylinder motors the reciprocating masses can be divided into several units and so arranged as to move in opposite directions, thereby neutralizing the inertia effects.

The two-cylinder motors present some advantages over the single-cylinder type. However, their use is also somewhat limited, and it is only a question of time until all commercial cars will be equipped with four-cylinder motors. The two-cylinder type presents an advantage over the single cylinder in that there are two reciprocating masses, so arranged that one affects the force of the other. However, perfect balance has not been reached and vibrations are still noticeable to a considerable degree.

In the four-cylinder motors now extensively used in commercial cars, the two inside reciprocating masses work together and the two outside work together. However, they are so arranged that the two inner ones always set against the two outer ones. Although they are equal in weight, they operate in opposite directions.

The turning movement of a four-cylinder motor is also much more uniform than that of a one or two-cylinder motor, hence the torque reaction and vibration due to it are much smaller. This four-cylinder type when properly constructed meets the requirements of vibrationless running quite satisfactorily.



Argo Electrics—Made in Two Models

TWO models, one of 1000 lbs. and the other of 2000 lbs. capacity, constitute the 1914 line of commercial electrics manufactured by the Argo Electric Vehicle Company, of Saginaw, Mich. Sturdiness, refinement and simplicity are the features aimed at in these vehicles.

The Motor and Drive

The motor is a Westinghouse four-pole, series wound, of unusual overload capacity. A large mica-slotted commutator, which is easily accessible through inspection covers, is fitted. The speed torque characteristics of this motor are particularly suited to commercial vehicle use, being such that a small increase in current produces a material increase in torque, which makes for a decided saving in current when operating on hills and very bad road conditions. High-grade annular bearings are used throughout the car. Compression grease cups and oilers are used. Bearings and gears are packed in grease.

Power is transmitted from the motor to the rear axle by means of double reduction herringbone and bevel gears, encased to form unit power plant, with complete elimination of universal joints or chains. These gears are of liberal proportions and operate without noise. The rear axle is of the full-floating type.

Control

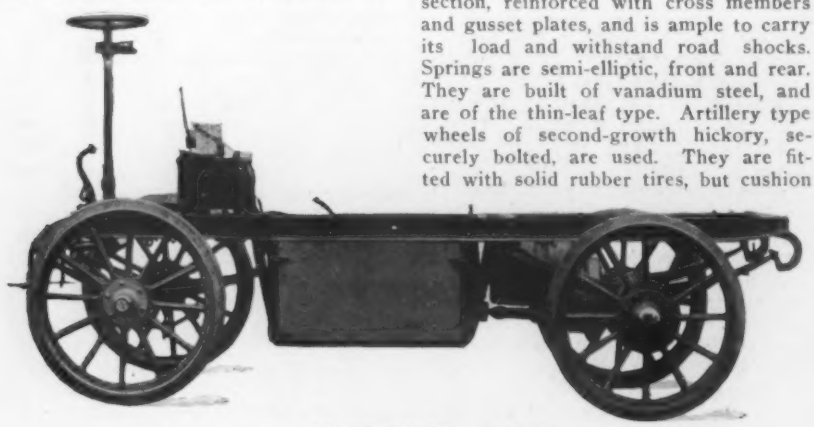
The control lever is located beneath the steering wheel and is advanced for driving ahead and retarded for driving backwards. There are four speeds forward and three reverse.

The controllers are of the drum type and are readily accessible. The steering gear is irreversible and is of the differential screw type. Both brakes are of the internal expanding type and operate on the rear wheels. One set is so interlocked with the controllers that application of the brake automatically cuts off the power, and the power cannot be reapplied until the brake is released.

Argo Model K-20, Open Express, Price, $2150
Carrying capacity 2000 lbs.; 96-inch wheelbase; 35 x 3½ inch solid tires; Westinghouse four-pole series-wound motor

Frame, Springs, Wheels, Etc.

The frame is 4 in. cold rolled steel section, reinforced with cross members and gusset plates, and is ample to carry its load and withstand road shocks. Springs are semi-elliptic, front and rear. They are built of vanadium steel, and are of the thin-leaf type. Artillery type wheels of second-growth hickory, securely bolted, are used. They are fitted with solid rubber tires, but cushion or pneumatic tires are furnished when ordered. The 1000 lb. capacity wagons have 34 x 3 in. and the 2000 lb. capacity 35 x 3½ in. tires. All bodies are best quality hardwood, securely ironed. Large panels are made of special Agasote material, which will not crack or warp. Standard colors are blue body with gray chassis, or Brewster green body with red chassis, striped and lettered, as desired. Special body designs and colors will be furnished to order.



Argo Model K-10 Chassis, $1750
The above price includes a Forty-Cell 11MV Hycap-Exide Battery. Price, with express or stake body, $1900

Batteries, Prices, Etc.

The standard battery equipment is the Exide Hycap Lead Battery, but any other make of equal quality and capacity will be furnished when desired. All wiring is best grade rubber covered flexible cable, and is carried wherever possible in standard conduit. Battery leads are all encased in lead.

A charging plug is placed on the front cross member, where it is readily accessible. Sanamo ampere hour meter, showing stage of charge or discharge of batteries, a hub odometer, giving total miles, complete outfit electric lights, electric horn, and all necessary tools, including hydrometer syringe and jack are furnished as regular equipment.

All the cars have 54 in. tread, while the 1000 lb. car has a 86 in. wheel base and the 2000 lb. car a 96 in. wheel base.

The 1000 lb. chassis, with 40 11MV Hycap cells, which give a 40 or 50 mile charge, retails at $1750, with an open express or stake body also at $1900. When closed panel bodies are furnished the price is $2150 and $2750, according to battery equipment. When equipped with 60 A-4 Edison cells, which give a 50 to 60 mile charge, the chassis sells

at $2350, and with open express or stake body at $2500. A removable top, with side and front curtains, for use on open bodies, is furnished at $150 extra.

The 2000 lb. chassis, when equipped with 40 13MV Hycap cells, retails at $2000; with 60 A-4 Edison cells at $2,600, and with 60 A-6 Edison cells at $3000. The first two equipments give 40 to 50 mile charges each, while the last gives a 60 to 70 mile charge. When fitted with a closed panel body, this wagon sells at $2400, $3000 or $3400, according to battery equipment.

A NEW TYPE OF 'BUS

The problem of designing a motor 'bus body with the necessary degree of comfort and convenience is a task with which many body builders have wrestled with varying success and the evolution of omnibus design has produced many distinct types of vehicles. The primary purpose has been to provide comfortable seating space for a given number of passengers with convenient means of ingress and exit.

Foreign Baker Users

This Baker two-ton electric truck is used by the Mitsui Company, of Tokio, Japan. It is here loaded with charcoal. Other foreign users of these trucks are the Sao Paulo Tramway Light and Power Company, of Brazil, South America; the Siam Electric Company, of Bangkok, Siam, and Richardson, Orr and Company, of Melbourne, Australia.

Glass-Roofed White 'Bus

This car is used by the John Rockett Taxicab Company, Boston, Mass.

It has remained, however, for the John Rockett Taxicab Company, of Boston, to produce a real innovation, and a new motor 'bus which the company will operate over some of New England's historic routes, including Lexington and Concord, is replete with novel features, chief of which is a glass roof. The glass is wired, built-in in sections and floods the interior with light although it has no relation to the overhead vision of the occupants. The 'bus is mounted on a standard White 3000-lb. chassis and has a capacity of 22 passengers. All of the seats are built transversely. Opposite each row of seats there is a window that is detachable. Here also is a departure from common practice, since the windows, when not in use, are stored in a special cabinet suspended beneath the chassis frame. Tires likewise are carried in a cabinet instead of on the running board or on brackets. The interior is designed for a varying number of passengers. Between each pair of cross seats there is a hinged extension which ordinarily drops down in the aisle beside the seat, but which, when raised, furnishes an extra aisle seat without a back.

TRUCKS TO COMPETE WITH RAILROAD

The Motor Truck Club, of Los Angeles, Cal., has announced that it will compete with the railroads from that city to the Pacific coast, about twenty miles distant, by operating a fleet of motor trucks over a specially constructed road. The members of the club are going to back their belief in the economy and efficiency of the truck to the extent of over $350,000, which the road will cost. It is proposed to build the motor truck highway, which will have a vitrified brick surface, from Los Angeles to the harbor of San Pedro. The road will be especially adapted to the use of heavy trucks, and every kind of merchandise will be transported from San Pedro, where it is laid down by ocean steamers, to the wholesale and retail districts of Los Angeles. The work is now being done by steam and electric railways, but there has long been general dissatisfaction against the slow, expensive service merchants have been getting. California is one of the best states in the union to try this experiment.

GMC Five-Ton Truck Fitted With the New Fender

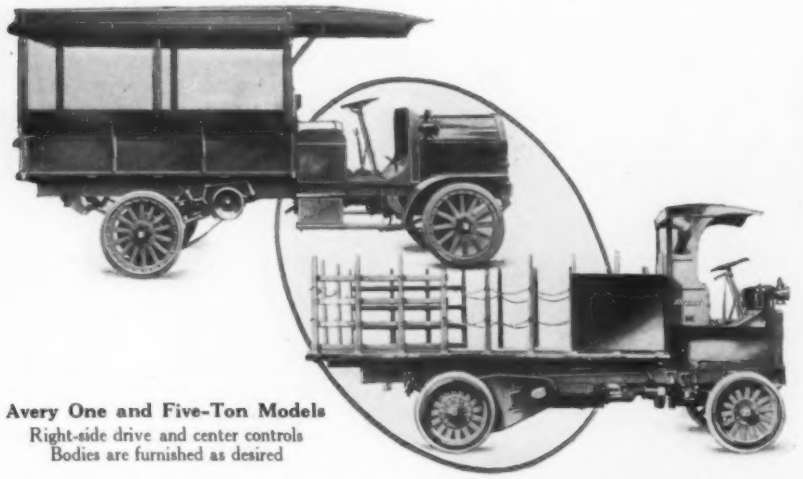
The fender is built according to specifications of the Detroit Automobile Dealers' Association Committee. This committee was appointed following the recent passage of the motor-truck fender ordinance by the Detroit Common Council. This is an experimental type, which may be improved later.

One and Five-Ton Avery Models

These two models are fairly representative of the trucks built by the Avery Company, of Peoria, Ill. Bodies are furnished as desired.

The One-Ton Model

The motor of the one-ton model is of four cylinders, with 4⅛ in. bore and 5¼ in. stroke, cast en bloc, and develops 27 h. p.



Avery One and Five-Ton Models
Right-side drive and center controls
Bodies are furnished as desired

The water jacket head is cast separate on this motor, attached by screws, and can be easily removed. This construction permits the cylinder core being more uniform and insures a better casting.

The large intake and exhaust valves are all on one side and are interchangeable. The intake steel heads are electrically welded to carbon steel stems and have seats and stems accurately ground to size. Both valves and springs are entirely enclosed, keeping them free from dust and moisture and making them practically noiseless. A Rayfield carburetor is used.

The pistons, connecting rods, camshaft, main crank shaft and gears are each made from special steel.

The crank case and flywheel housing is cast of nickel aluminum alloy, and is made in two pieces, the upper half carrying all main shaft bearings, so that by removing the lower, these are readily accessible for adjustments.

In this motor, a force feed constant level system of lubrication is used and is effected by means of a plunger pump which forces the oil through copper tubes to a point over the timing gears and over the rear main bearing, from where it drains back into the crank case, maintaining a proper level for the splash lubrication of the pistons, connecting rods, and crank shaft bearings. Provisions are made for draining the oil and the removing of the strainer for cleaning. Water circulation is afforded by means of a large centrifugal pump.

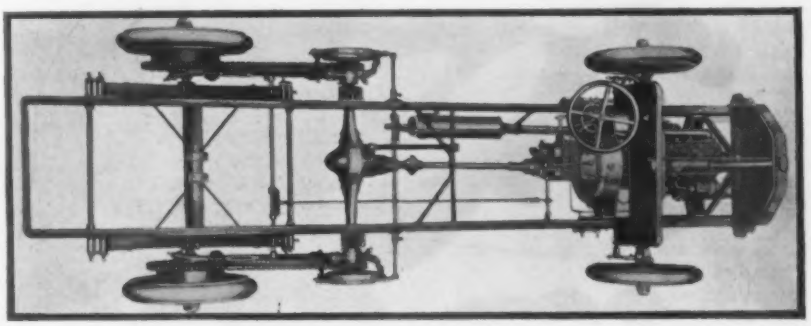
Clutch and Transmission

The clutch used in the one-ton Avery truck is of the multiple disc dry plate type. It has fourteen steel plates, alternate plates being faced with Raybestos. The large area of rubbing surfaces of these plates prolongs the life of the clutch by reducing wear, and makes possible easy and smooth engagements of the power.

The transmission is of the selective sliding type, and has three speeds forward and reverse. The bearings are Timken roller throughout. The transmission and clutch housings are cast in one piece of nickel aluminum, and this unit is bolted rigidly to the fly wheel housing on the motor. This provides unit power plant construction of the most approved type and assures perfect alignment of motor, clutch and transmission shafts. The gear shift rods are provided with an automatic lock, making the selection of two speeds at the same time impossible. This prevents the possibility of stripping the gear or breaking the transmission shafts. The bearings are all readily adjustable from the outside of the transmission housing, a feature of great convenience. The housing is provided with a large filling hole for the application of grease. The entire transmission, clutch and universal joint can be entirely uncovered by removing the front floor boards which are left loose for this purpose.

The Driving Line

The drive is from the transmission to the differential on the jackshaft by means of a propeller shaft and a single universal joint, and from the jackshaft to the rear wheels by double side chains. On this truck a Timken drop forged "I" beam front axle is used, also Timken jackshaft, radius rods, brakes, rear axle, sprockets, hubs, etc. This equipment is built specially to carry the heavy loads and resist the extraordinary shocks and emergencies which a truck has to meet. With the bridge-like radius rods, strength and flexibility are combined, and it is impos-



Chassis of One-Ton Avery Truck
Showing left-side drive and center controls. Note the auxiliary cross spring over rear axle

sible for any shocks to tear the rear axle away from the jackshaft. Vertical and horizontal swivel joints allow compensation for strains, no matter from which direction they come. The rear axle is Timken drop forged rectangular section 1¾ in. x 2½ in.

Springs, Wheels, Brakes and Frame

The two front springs are semi-elliptic, 40 in. x 2½ in.; the two rear are also semi-elliptic, 45 in. x 3 in., with an auxiliary rear spring 29 in. x 2½ in. The wheels are S. A. E. standard. The brake system consists of a foot operated service brake of the external contracting type on the jackshaft, and a hand operated emergency brake of the internal expanding type on the rear axle. The frame is 5 in. channel section, braced and riveted. The full length is 196 in., length back of seat 110 in., the width 32 in., height when loaded to top of frame 32 in. Bodies are furnished as desired.

Equipment, Etc.

The wheelbase is 128 in., the tread in front is 58 in., in the rear 59⅛ in. The equipment includes two side oil lamps, one tail oil lamp, tools, jack and horn. The price of the chassis is $1960 f. o. b. Peoria, Ill.

The Five-Ton Model

The motor of the five-ton model is of four cylinders, with 5¼ in. bore and 5¾ in. stroke, cast in pairs, and develops 44.2 h. p. The head of this motor is of the same type as that of the one-ton model. All valves are 2½ in. in diameter, are on opposite sides of the motor and are interchangeable. The two camshafts are drop forged from a single piece of low carbon steel with the cams integral on the shafts, which run in long, white bronze bearings.

All gears are helically cut on special automatic hobbing machines and particular attention is paid to accurately maintaining gear centers. Bearings are of liberal size and made of high grade nickel Babbitt. The connecting rods and counter shaft bearings are held in place by brass retaining screws. The crank shaft is of the three bearing type with well proportioned and liberal sized bearings. It is made of carbon steel drop forged and heat treated, giving it a tensile strength of 90,000 lbs. per sq. in.

The pistons are cast from the same grade of metal used in the cylinders. They are of extra length and accurately ground to correct size so as to insure a perfect fit in the cylinders. The piston pins are made of seamless, cold drawn steel tubing and carbonized.

The crank case is made from the best grade of nickel aluminum alloy, and is of the two-piece type, with all bearings carried in the upper half. In this motor the splash, constant system of lubrication is maintained by a gear pump. This pump supplies three streams of oil under positive pressure, one being fed in over the gears and the other two distributed equally to the connecting rod bearings. A 1¾ in. Schebler carburetor receives the gasoline supply from a tank, of 30 gal. capacity placed under the seat.

Water circulation is afforded by a large double bearing type centrifugal pump. A storage battery with an Eisemann coil and Eisemann dual automatic magneto are furnished as the ignition system.

The Clutch, Transmission and Drive

In this truck the Hele-Shaw type of clutch is used. It consists of twenty-nine 8½ in. plates which amount to 560 sq. in. of frictional area. Each plate has a V-shaped circumferential groove. When the clutch is engaged these grooves slip one over the other and the rest of the flat part of the plates press firmly together, thus forming a combination cone and multiple disc clutch.

The transmission is of the selective type, having three speeds forward and one reverse. The gears and shafts are of the best grade of steel; bushings are of a compound of red bronze. Imported annular bearings are used throughout. The transmission and differential are integral.

The drive is by a jackshaft, with twelve tooth sprockets, 1 in. Diamond chains, and a forty-three tooth sprocket on the rear wheels. The drive chains are enclosed.

Wheels, Frame, Brakes and Springs

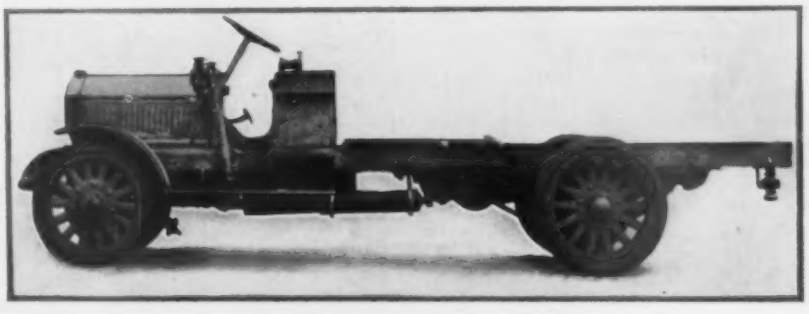
The wheels are S. A. E. standard. The frame is 8 in. channel section, braced and riveted; the length behind seat is 154¼ in., the width 32 in. The brakes are a foot operated service brake, of the internal expanding type on the jackshaft, and a hand-operated emergency brake on the rear wheels. The springs are 40 in. x 3 in semi-elliptic on front and 48 x 3½ in. semi-elliptic on rear.

Equipment, Etc.

The equipment includes two oil side lamps, one oil tail light, tools, jack and horn. The tread in the front is 64 in.; in the rear 72 in. The wheel base is 140 in. Bodies are furnished as desired. The price is $4500 f. o. b. Peoria, Ill.

The Hexter Gas-Electric Truck

The most important features incorporated in the gas-electric truck marketed by P. K. Hexter, of 142 West 42nd Street, New York City, are simplicity of control, foolproofness and the little attention necessary for the upkeep of the parts behind the gasoline motor.



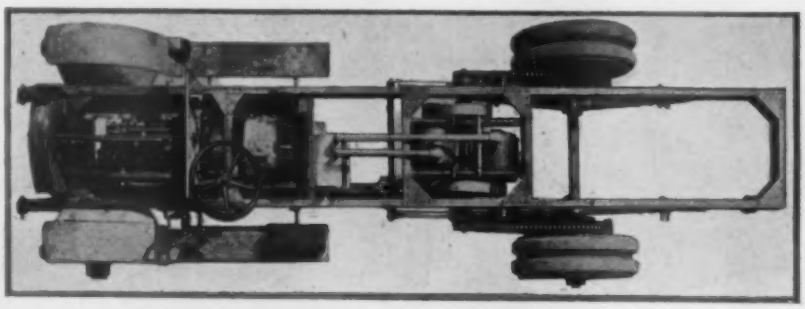
The Hexter Gas-Electric Truck
Wheelbase, 156 in.; load space behind seat, 144 in.; tread, 62 in. front, 65 in. rear. Capacity, 8000 lbs.

The Gasoline Motor

The gasoline motor is four-cylinder, 4½ in. bore and 6¾ in. stroke. Valves are entirely enclosed. A pump without sight feeds or gages is used for lubrication. A G. & A. carburetor, which has no adjustment, is used. Ignition is by an Eisemann magneto with an automatic advance. The crank shaft is very heavy, has 2 in. pins, and long bearings.

The Generator and Motor

The generator, which is mounted on a sub-frame, directly behind the motor,



Chassis of the Hexter Gas-Electric Truck
Four-cylinder motor. Generator mounted direct on motor. Two electric motors, each driving one rear wheel through chains

and is coupled direct to it, is compound wound, continuous current, and generates 7½ k. w. at 900 r. p. m. It is designed to take all the overload, of which the gas motor is capable.

Two series wound motors are mounted at approximately the center of the chassis, each driving one sprocket, which drives the rear wheel by means of a chain. This arrangement does away with the necessity of a mechanical differential. Chances of skidding are much reduced, it is claimed, with this drive, and the life of chains and sprockets is lengthened considerably. The overload capacity of the motors allows a large margin of safety.

The controller is of a simple rotating type, and all leads and terminals are fully enclosed, protecting them from the weather. All connections are marked in plain letters, so that all connections may be broken and anyone may put them together correctly.

Control and operation are extremely simple. A pressure of the foot on the accelerator pedal gives all changes of speed required, after the controller handle has been placed in a corresponding position to that in which it is desired to move the truck. An emergency position is provided on the controller, the use of which is only necessary on hills which are difficult to negotiate.

Brakes, Springs and Wheels

Two brakes are provided, both operating on the rear wheels. The brake drums are 18 in. in diameter, and the width of each band is 3½ in., giving ample area for all emergencies.

The external contracting brake is operated by a foot pedal, and the internal expanding brake by a hand lever.

The front springs are semi-elliptic, 46 in. long and 3 in. wide. Rear springs are semi-elliptic underslung, 54 in. long and 3 in. wide. Wheels have fourteen 3 in. spokes. Front wheels are 36 in., with 5 in. tires. Rear wheels are 41 in., with 5 in. dual tires.

Other Details

The capacity is 8000 lbs. Wheel base is 156 in., with a loading space behind the seat of 144 in. Front tread is 62 in.; rear, 65 in.

Transit Truck—Made in Four Sizes

The Transit Motor Truck Company, of Louisville, Ky., offers a new line of trucks, in four models, five, three-and-a-half, two and one-ton capacities. These trucks are fitted with Continental motors and Timken front axles and final drives, including jackshaft, sprockets, chains and rear axles.

The Five-Ton Model

The motor is four-cylinder, 4 in. bore and 5½ in. stroke, L-head type, and cast in pairs. It has a self-contained oiling system operated by two plunger pumps. Ignition is by a Mea high tension magneto. Cooling is by a centrifugal pump and ball and socket spring supported honeycomb type radiator. The gasoline tank, placed under the seat, holds 25 gal. An automatic governor controls the speed at 10½ m. p. h.

Clutch and Transmission

The clutch is of the multiple disc type, running in oil, and is interconnected with the foot brake. The transmission is integral with the jackshaft, and is of the selective type, giving three speeds forward and reverse. Gears are made of alloy steel.

The jackshaft is of the full floating type. Detachable roller chains are used to hook up the jackshaft and rear wheels.

The Frame and Bodies

The frame is 6 13-16 in. deep, pressed steel, reinforced by heavy cross-members and gusset plates. Bodies are furnished to suit the purchaser.

Wheels, Brakes and Springs

The wheels are of the artillery type, and are made of second growth hickory, They are fitted with solid tires, 36 x 6 in. front and double 40 x 6 in. rear. An emergency brake operating on the rear hubs and a service brake operating on the ends of the jackshaft are used. Semi-elliptic springs are used on both front and rear. The rear has an auxiliary cross spring which comes into play only when the truck is loaded.

The steering gear is a Ross irreversible with a 22 in. steering wheel. Drive is on the right side with the control levers at driver's right. The equipment includes three oil lights, exhaust horn, hub odometer, tools and jack. The wheelbase is 144 in. and tread is 72 in. The chassis price in the priming coat is $4,500.

The Three and a Half Ton Model

The carrying capacity is 7000 lbs. The tread is 64 in. in front and 66 in. in rear. The load space is 14 ft. to 16 ft. and any width desired. In other respects it is the same as the five-ton model. The chassis price is $3500.

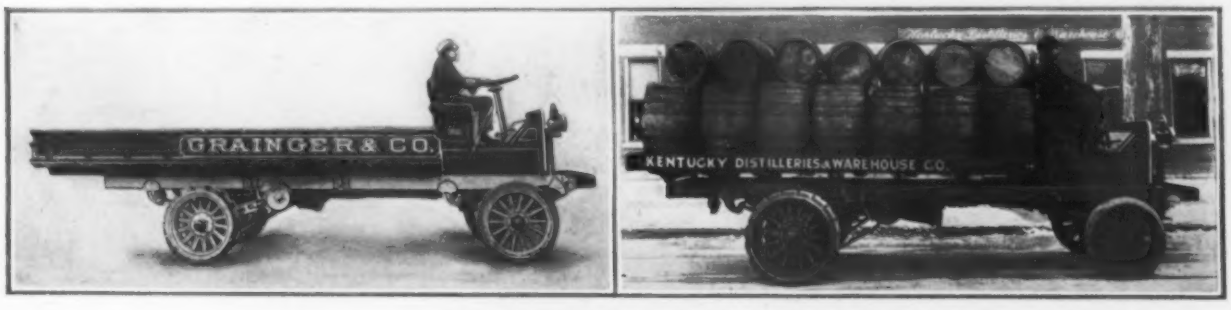
The Two-Ton Model

The bore of the motor is 4¼ in. and the stroke is 5¼ in. The load space is 12 to 14 ft. The tread is 64 in. and the carrying capacity is 4000 lbs. The chassis price is $2850. It is the same as the five-ton model in other respects.

The One-Ton Model

The motor has a 3¾ in. bore and 5¼ in. stroke. The load space is 128 in. Wheels are either wood or steel. Tires are 34 x 3½ in. in front and 34 x 4 in. in rear.

The wheelbase is either 120 or 130 in., and the tread is 56 in. The carrying capacity is 2000 lbs. Speed is governed at 18 m. p. h. The chassis price is $2000.



One-, Five- and Two-Ton Transit Trucks

The wheelbase of the one-ton car is 128 in. Chassis price is $2000. Although the two- and five-ton models have loading spaces of fourteen and sixteen feet respectively, and the wheelbase is but 144 in., there is no excessive rear overhang

New Two-Ton Pierce-Arrow

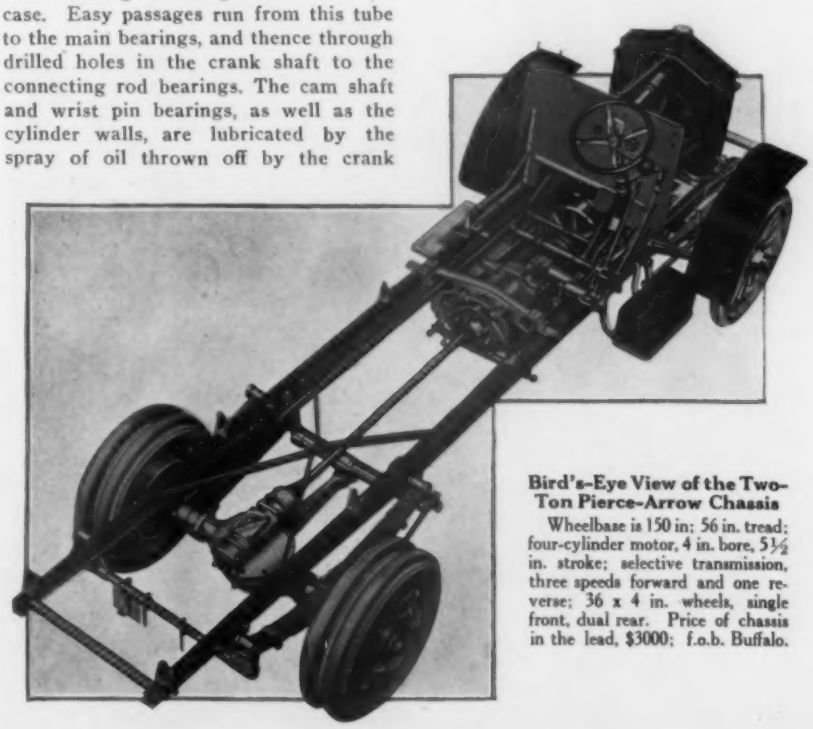
LEASED with the success of its 5-ton truck, which has been in use for some time, after an exhaustive period of experimentation, the Pierce-Arrow Motor Car Company, of Buffalo, N. Y., is now prepared to introduce to its patrons a 2-ton, worm driven motor truck, the first deliveries of which will be made in September. The general design of this new Pierce-Arrow product is along exactly the same lines as that of the 5-ton truck. Minor refinements and improvements which the experience of the last three years has demonstrated as necessary or desirable have been incorporated, but there are no radical changes or departures from present methods of either design or manufacture, and this smaller edition of the large truck is introduced with every confidence that it will successfully perform those duties for which it is designed.

The Motor

The motor is four cylinder, four cycle, 4 in. bore and 5½ in. stroke and is governed at a speed of 1050 r. p. m. The cylinders are of the T-head type; valves are on opposite sides. The valves, cam shafts, crank shaft and gears are designed and manufactured exactly as on the 5-ton truck, which has proven so successful.

A large rotary pump, directly coupled to the cam shaft, takes oil from a well at the bottom of the crank case chamber and delivers it under pressure to a large tube running the length of the crank case. Easy passages run from this tube to the main bearings, and thence through drilled holes in the crank shaft to the connecting rod bearings. The cam shaft and wrist pin bearings, as well as the cylinder walls, are lubricated by the spray of oil thrown off by the crank shaft. This spray falls into the base of the crank case and is thoroughly strained before being used over again. Practically all oil tubes, passages and connections are inside the motor crank case, so that if a small leak develops the oil merely drips back into the pump and is not lost, thus economizing the oil. Only two tubes go outside; one up to the pressure gage and relief valve on the dash, the other the return pipe. There are only four outside joints to keep tight. The gage in conjunction with a float indicates the level of the oil at all times.

A Bosch independent magneto generates the current producing the spark inside the cylinders. But one system has been fitted and special care and precaution has been taken that this should be thoroughly reliable. Ignition is controlled by a single switch on the dash, leading directly to the magneto. The high tension wires run through fibre blocks and are strung through the air, thus affording the maximum insulation. The spark plugs are screwed into a special socket over the piston, and give a steady, uniform spark. The standard Pierce-Arrow carburetor, modified to suit the special demands of this truck motor has been used. This carburetor is of the automatic type, easily adjusted and controlled. Throttle control is effected by a foot accelerator. A centrifugal pump directly coupled to the engine gears forces water under pressure through the engine system, thence to a vertical tube radiator.

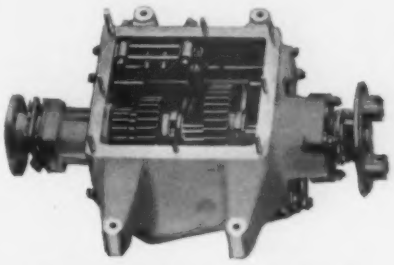


Bird's-Eye View of the Two-Ton Pierce-Arrow Chassis

Wheelbase is 150 in; 56 in. tread; four-cylinder motor, 4 in. bore, 5½ in. stroke; selective transmission, three speeds forward and one reverse; 36 x 4 in. wheels, single front, dual rear. Price of chassis in the lead, $3000; f.o.b. Buffalo.

Clutch and Transmission

The clutch is of the Pierce-Arrow standard cone type, faced with leather. Surfaces are of large diameter and width. Withdrawal is effected by a pedal, throwing out two ball bearings mounted on a fork. These, in their turn, act on the flange of the clutch, throwing it out. This system is very simple and reliable. There is a double universal joint between clutch and transmission to compensate for any small errors in alignment. This joint is of the internal and external gear type with large bearing surfaces. The joint is completely cased in and filled with grease. Its shape insures the grease reaching the bearing surfaces and keeping them constantly lubricated.



The Pierce-Arrow Transmission

The teeth have extra wide faces. A safety catch prevents more than one gear being in mesh at a time.

The transmission is of the selective type, giving three speeds forward and one reverse. By means of a safety catch, it is impossible to have more than one gear in mesh at a time. The gear wheels and shafts are made of modern high grade steels carefully heat treated, according to the strains to which they have to be subjected. The faces of the teeth are wide and the whole transmission is made in a very substantial manner. Ball bearings of the self aligning type are used throughout, even in the spigot bearing at the end of main shaft. Precautions are taken to insure as little leakage of oil as possible. The engine and transmission are mounted rigidly on a subsidiary frame, itself very rigid. This frame is secured to the main frame by a hinged joint at front and two joints fixed widely apart at the rear, thus giving a perfect three-point support. This is a form of suspension similar to that which has been used so successfully on the 5-ton truck. The addition of the sub-frame, however, has simplified and rendered more robust this suspension.

The Drive

Power is transmitted to the rear axle by means of a stout propeller shaft

with universal joints at each end. The design and construction of the rear axle follows that of the 5-ton worm drive truck. The worm drive is mounted rigidly in a dust proof case of steel that carries the full weight of the load, the shafts to wheel transmitting the power only. These shafts are of extra large diameter, giving an extreme factor of safety to take care of road shocks and vibrations. Two side radius rods transmit the tractive effort re-actions to the chassis frame, eliminating all driving stresses from the rear springs. Ball bearings are used throughout the system with Timken roller bearings on the wheels. The front axle is a one-piece forging, following out exactly the same design as on the 5-ton truck. The steering system is also the same, and is of the nut and screw type of very heavy construction.

Wheels, Brakes and Springs

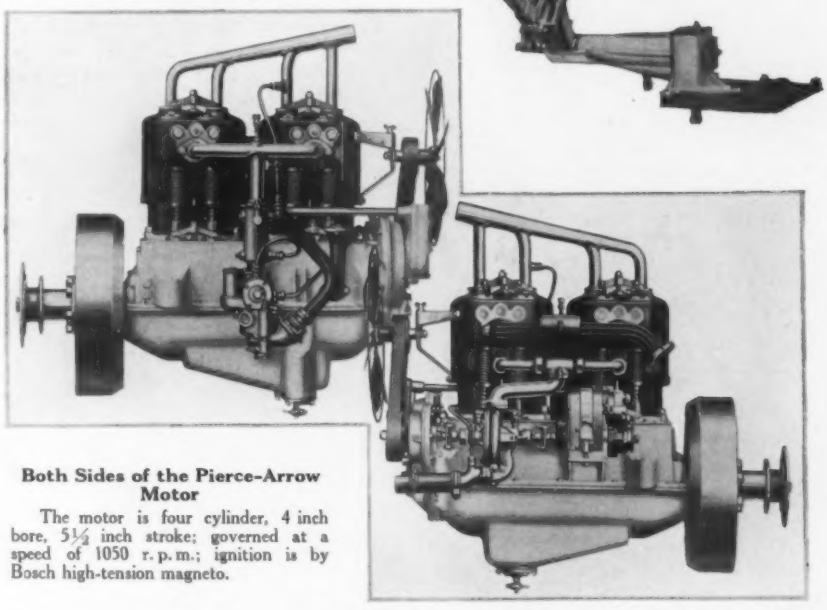
Front and rear wheels are made of carefully selected wood of the same design that has been so successfully employed in the 5-ton truck. The front wheel is 36 x 4 in. single; the rear wheel is 36 x 4 in. dual. Two separate and independent braking systems are used. The foot, or service brake, operates on a drum behind the transmission, by means of contracting shoes lined with suitable fabric. The hand brake operates on special drums at the rear wheels, internal expanding shoes pressing outwards on each wheel drum.

The springs are semi-elliptic front and rear and are specially long to give the maximum of easy riding at all loads. The rear springs are shackled at both ends take no part in the drive of the truck, and are very free and flexible.

Frame, Equipment, Etc.

The main frame members are of ample depth and strength, and, like the other parts of the chassis, are made of special steel, heat treated to give the best results. Chassis equipment includes the running gear, tires, which are furnished with demountable rims, and mechanism complete in lead; driver's seat, dash and footboards, front mudguards, side and tail lamps, horn and set of tools, Bosch magneto and tank, which holds 15 gal. It also includes metal clips, for clipping wooden sills of the body to chassis.

Gear Shift and Brake Levers; Also Housing



Both Sides of the Pierce-Arrow Motor

The motor is four cylinder, 4 inch bore, 5½ inch stroke; governed at a speed of 1050 r. p. m.; ignition is by Bosch high-tension magneto.

The wheelbase is 150 in., with a 56 in. tread. The chassis overall is 122 in. long and 66 in. wide. The body fitted would be 126 in. long and 72 in. wide. Top of frame is 30 in. from the ground. The total admissable load on chassis, including body and load, is 5200 lbs. The price of the chassis in the lead is $3000 f. o. b., Buffalo, N. Y.

Buick 1914 Commercial Cars

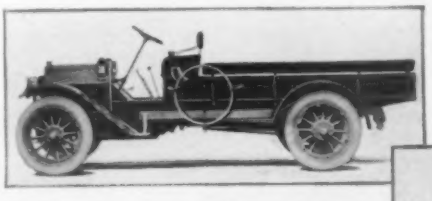
The two new commercial cars—No. 3 and No. 4—which were recently added to the line of the Buick Motor Company, Flint, Mich., have been continued and are to be known as the 1914 commercial cars. A feature of construction is the mounting of the engine and transmission on a sub-frame, making possible the removal of both separately, or as a unit, by the removal of four bolts.

The Motor

The four-cycle motor, having the four cylinders cast en bloc, has a bore of 3 in. and a stroke of 5 in. and is placed under the bonnet. The crank shaft is 1¾ in. in diameter and has three main bearings. The valves have nickel steel heads and are 1⅝ in. in diameter. Cooling is by thermo-syphon system, a vertical tube radiator being employed for the purpose, and the oiling system is of the constant level splash type, circulation by gear pump, with sight glass on dash. An adjustable sealed governor is fitted.

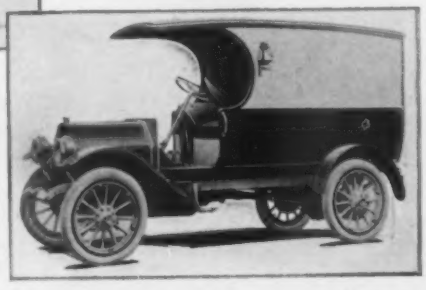
Transmission

The cone clutch is faced with leather; drive from here is through a propeller shaft to the transmission, which is of the selective sliding type, with three speeds forward and reverse, direct on third. The gears are of nickel steel, heat treated, mounted on shafts whose main bearings are double row ball.



Buick 1500 lb. Express and 1000 lb. Panel Jobs

The chassis prices are $1125 and $1000 respectively



Axles

The rear axle is of the three-quarter floating type and has a main shaft 1½ in. in diameter, of Nayari steel, heat treated, and the pinion shafts are 1⅜ in. in diameter, of carbon steel, cold rolled. The intermediate and bevel gears are of carbon steel, case hardened, and the bevel pinions are of nickel steel, case hardened. All bearings are Hyatt roller, with nickel steel rolls. Ball thrust

bearings are employed at outer ends, having hardened and ground discs and ⅜ in. balls.

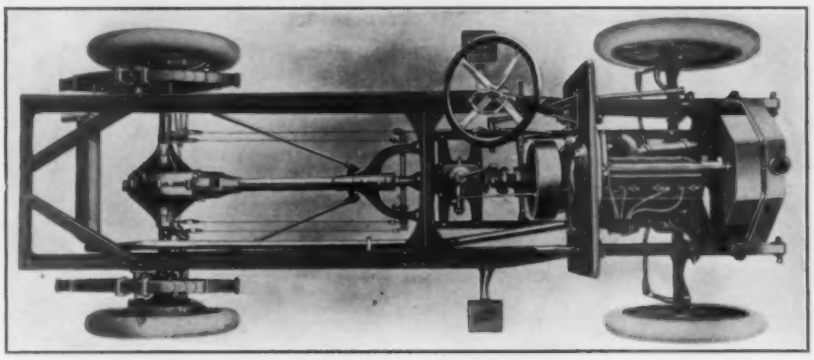
The front axle is a heavy I-beam section. The front wheel bearings are of the cup and cone type, with steel balls.

Brakes, Springs, Etc.

The foot brakes are of the contracting and the hand brakes are of the expanding type, both on drums on rear wheels. The front springs are semi-elliptic and the rear springs are full elliptic.

The frame is of pressed steel, of heavy type, strongly braced and reinforced with cross members and diagonal pieces. The wheels are of the artillery type, fitted with demountable rims.

The new Buick truck is made in two capacities, one of 1000 lbs. and one of 1500 lbs. carrying capacity. The former has a wheel base of 100 in. and is fitted with 33 x 4½ in. pneumatic tires, while the latter has a 122 in. wheel base and is fitted with 35 x 5 in. pneumatic tires. The steering wheel is on the left side with center control.



Plan View of the Buick Chassis

These cars can be had fitted with either express, stake or panel bodies of various lengths and widths, at $100 and up extra. The chassis prices are $1000 and $1125, respectively.

MOTOR TRUCKS PROVE EFFICIENT IN LOS ANGELES

About two years ago Los Angeles had 87 motor trucks in service. To-day it has between 2500 and 3000, the number growing so rapidly that it is not possible to state with accuracy just exactly how many are in service. This city, with a population of approximately half a million, is one of the most enterprising motor centers in the United States; has the largest auto club in the country and the second motor truck club to be established; an organization of owners and dealers that has done excellent work in defending the rights of users of the commercial vehicle.

Among the large users of motor trucks are the brewers and distributors, all of whom use two or more trucks, while the Meier Brewing Company has ten in commission and is planning to get rid of its teams gradually and make use of twenty-four 3-ton trucks.

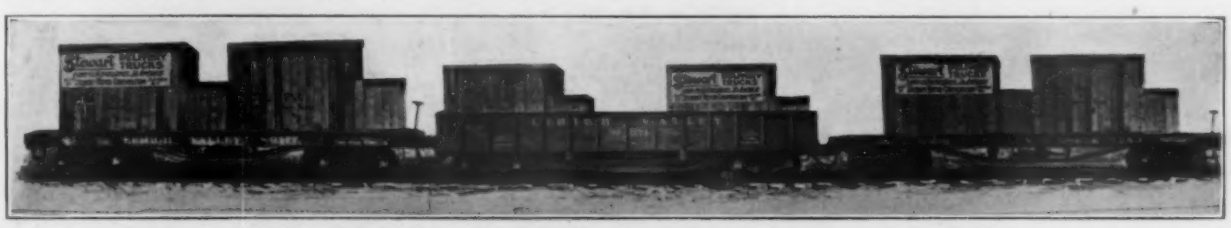
This company began more than a year ago to try out six different makes of trucks, ranging in size from 1½ to 5 tons capacity, and a very accurate record was kept of their comparative efficiency with the idea of standardizing the service. The plans involved the use of a given truck over a certain route for two months. Careful record was kept of fuel and lubricant cost; of up-keep charges and repairs; in fact, the company went so far as to disregard the service offered by some truck agents, and made all its own repairs in order to check costs accurately. Every two months another of the trucks to be tested was sent over the same route, so that the comparisons would be made upon the same conditions. A maximum efficiency mark of 100 per cent. was set and out of the six only one came to anything like the maximum. The Peerless scored 90 per cent. on the test, and in order to make certain that there was no mistake, it was selected for further tests extending over a period of fourteen months in all. The result was that the company selected the three-ton truck of that make for its standard, and has placed orders for three more, and will make up its fleet of twenty-four by adding the same vehicle from time to time as the teams are taken out of service. This firm has extensive city delivery systems, and in addition to that hauls to outlying towns and to the beaches, a distance of 15 to 20 miles; and it is in the long distance work that the truck proves its superiority. For general delivery the cost per ton mile is about 6 cents, about half of the cost by horse-drawn vehicles. For delivery in the congested districts, the teams may be retained until the final shift is made, as the work there involves very short hauls and very long stops for loading and unloading, and under these circumstances the teams are about as cheap.

About a dozen bakeries use motor trucks, the largest user being the Bradford Baking Company, which has fifteen 1-ton to 1½-ton cars in service. There are probably forty in this business and more cars are constantly being added. They are divided among about a dozen firms, among whom H. Jevne and J. R. Newberry are extensive users. The former firm conducts a general grocery business as well and makes use of eight 1½-ton trucks, which are sent out very early in the morning for bread delivery. They complete the routes in a few hours, that would require all-day service for horses, and then return to serve for general delivery of groceries for the balance of the day.

There are six large meat packing firms in Los Angeles and a few smaller ones, each using from one to four trucks. Swift & Company uses two 2-ton cars, and Armour uses three ranging from 1½ to 2-ton capacity. Some firms, including the California Dressed Meat Company and the Hauser Company rent trucks, about four each.

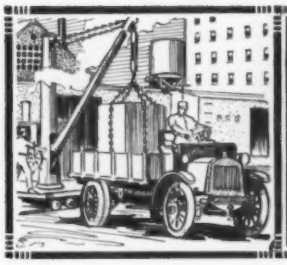
Among the trucks extensively used in these lines are the Federal, Peerless, Alco, G. M. C., Kelly, Reliance and the locally built Moore and Moreland.

The various manufacturers are well represented in this city, there being no less than twenty-five agencies, all of which are doing an active and constantly increasing business.

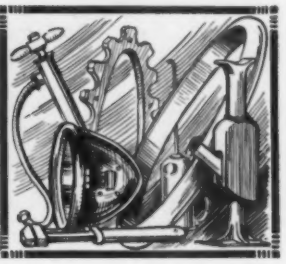


Six Stewart Trucks Crated for Shipment to Buenos Aires, South America

Nearly two months of constant travel is the experience of Stewart delivery trucks shipped from the Buffalo factory to Buenos Aires. Carefully crated for the long steamship journey from New York, the cars look like small houses on board the Lehigh Valley flat cars



TRUCK ACCESSORIES AND APPLIANCES



THE STEWART-WARNER HUB ODOMETER

The Stewart-Warner Speedometer Corporation, 1826-52 Diversey Boulevard, Chicago, Ill., is placing on the market its new hub odometer, which is operated by a positive drive that the manufacturers claim cannot fail. This drive consists of steel pinions with worm and spiral gears,

Stewart-Warner Hub Odometer
Fitted on hub of either trucks or electrics

each pinion being machined from a single piece of steel, heat treated and hardened, to resist wear. Through an ingenious application of the "Geneva Stop" mechanism, the dials are locked, excepting at the instant of registering. Those not registering remain locked. Thus it is claimed it is impossible for the dials to fail to register, or, to register incorrectly, as they cannot make a false movement. This Odometer is absolutely springless, and there are no pawls or ratchets. Its price is $15.

A NEW ROLLER BEARING

James C. Reber, of Reading, Pa., is manufacturing a new and improved roller bearing made either plain or taper, in single or double row type for light, heavy or medium duty. The inner and outer races and rollers are made without projections, permitting of the utmost simplicity in manufacture and accuracy in grinding. The load carrying rollers are separated by intermediate rollers which perform the combined purpose of guiding the rollers, retaining them on the inner race and also relieving the friction as they revolve in the opposite direction of the load carrying rollers.

This bearing can be easily taken apart for cleaning, and a novice can re-assemble it. It is not necessary to remove the parts having a press-driving or suction fit from either shaft or housing, when taking apart, as the parts are readily separated, and with its simple retainers are always ready for re-assembling. It is adjustable to take up the wear should there be any. It has retainers only for the purpose of holding rollers when separated from the outer race, and has no other duty to perform, as the bearing works without the retainers.

BUSHEY GASOLINE VAPORIZER

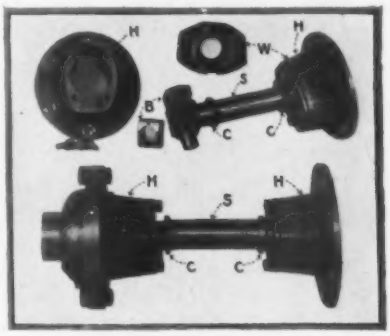
E. J. Bushey, 1790 Broadway, N. Y., calls attention to his new vaporizer which has no moving parts, is made of perforated sheet brass and goes in manifold flange on top of carburetor.

The blades are shaped like a propeller which gives the mixture a whirling motion and breaks it up so perfectly that it enables the user to mix 10 to 25 per cent. kerosene with his gasoline and still gives the motor better combustion and greater efficiency, economy and flexibility at all speeds. The vaporizer is especially recommended for commercial car use.

A NEW UNIVERSAL JOINT

A new double universal joint, known as Style D, has been added recently to the line of the Blood Brothers Machine Company, of Kalamazo, Mich.

As will be observed, the number of working parts has been reduced to a minimum. The two working ends are connected by a shaft "S," which may be made any length to suit the requirements. Integral with this shaft on both ends are formed the gudgeons, which work in the pivot blocks "B." These in turn have a sliding bearing in the slot broached through the oval shaped hubs "H." These hubs are forged in one piece with the flange so that this single steel forging comprises the structural part, as well as casing for the joint.



Blood Brothers' New Double Universal Joint
Upper view shows joint assembled, while the lower shows one of the joints taken apart

The flanges are adapted to bolt on to companion flanges that will be furnished with the joints or to bolt directly on to a fly wheel or clutch.

The only things necessary to complete the casing to hold the lubricant are the split metal washers "W," that are secured to the ends of the oval hubs by four cap screws after inserting a leather packing.

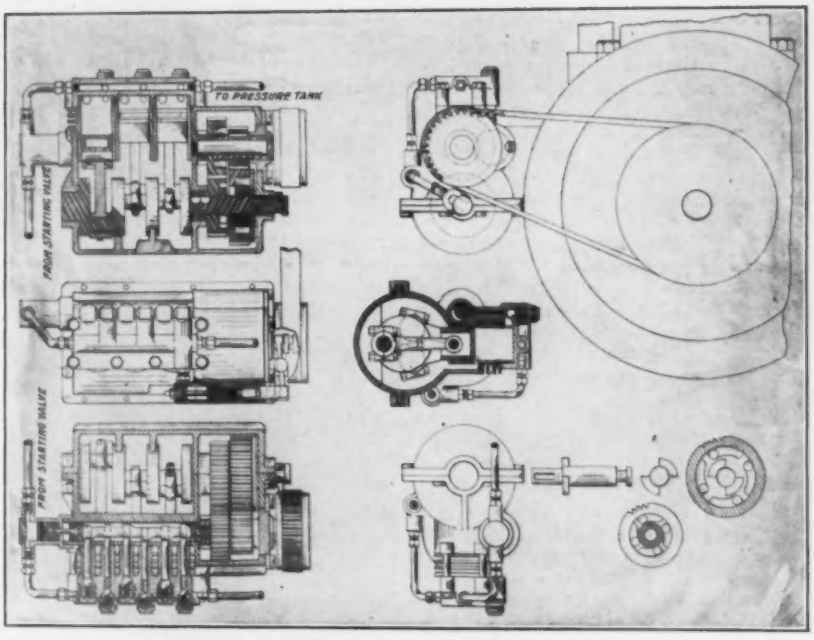
Endwise movement of the connecting shaft "S" is limited by means of collars "C" turned on the shaft, which act against the metal washers "W."

The Reber Roller Bearing, Disassembled

A NEW COMBINED AIR-STARTING MOTOR AND COMPRESSOR

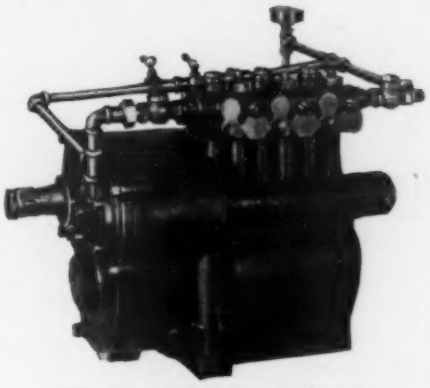
The Shimpf starting motor and compressor, designed and built by Walter H. Shimpf, 1931 Broadway, New York City, as indicated by its title, is an air motor and compressor combined in one unit, a device which under certain adjustment will act as a motor or prime mover, and under a different adjustment will act as a compressor for compressing air, the compressed force of which may thereafter be utilized for various purposes such as cleaning the car, operating brakes, blowing signals, pumping tires, etc., including the operation of the device as a motor.

When used in connection with an automobile, it is directly connected by a suitable means with some moving part of the engine, and through a system of gearing and automatic clutches, will either drive the engine for the purpose of starting it, or be driven by the engine for the purpose of compressing air to a predetermined pressure into a receiving tank, thereafter remaining idle while the engine is in operation, until the pressure is reduced.



The Shimpf Air-Starter and Compressor Assembly

Showing the cylinders, pistons, connecting rods, crank shaft, valve mechanism, gearing, roller clutches, feed and delivery air pipes and connection to motor



The Shimpf Air-Starting Motor and Compressor

The opening of a valve on the dashboard automatically shifts the cam shaft so as to bring into contact with the cams one or more of the push rods, opening the valve to whichever cylinder is at that time in position to receive the air under pressure; this in turn drives the piston and crank shaft, making an independent air motor which, through the two to one gear between the crank shaft and the jack shaft of the motor and a two to one gear between the jack shaft and the engine, revolves the crank shaft of the automobile engine rotating the same until combustion takes up these duties. As soon as the automobile motor has started, the closing of the dash valve allows the cam shaft to return to a position where the cams do not actuate the push rods, this operation making the valves automatic and the device a compressor. This device is so designed that by the shifting of the cam shaft the various pistons will act directly as compressors or as driving pistons utilizing the same valves and depending upon whether the valves are actuated by the cam shaft or actuated automatically. The gearing of the starting motor and compressor is controlled automatically by roller clutches.

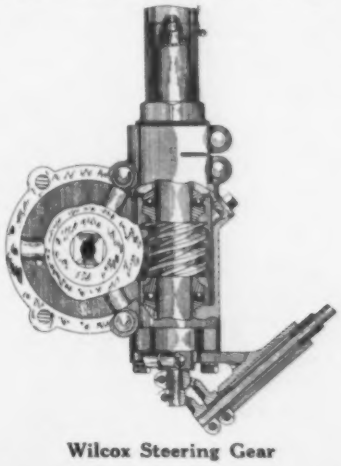
The device has three cylinders of 1⅝ in. bore by 2⅛ in. stroke, with crank pins at 120 deg. The cylinder, crank case and gear case are cast en bloc, occupying a space 13 in. by 10¾ in. by 8 in.

The lubrication is by splash, the crank and gear case acting as an oil reservoir. A pneumatically controlled dental clutch between the crank shaft and the two to one counter reduction controls the action as a compressor, allowing the compressor to operate until a pressure of 200 lbs. is attained, and at that point automatically disconnecting so that the crank shaft, piston, etc., are idle.

THE WILCOX STEERING GEAR

The steering gear here shown has a double saucer seat, self-aligning thrust bearings, double pinch clamp on adjusting nut and a 1 3-16 in. diameter steering tube which gives exceptional strength.

The bearing points are bushed with bronze bushings, cut with spiral oil grooves. There is a double bearing in the worm wheel shaft which is hollow and has oil channels running into the bushings in both bearings. The bearing surfaces are ground, including the steering worm, which is ground over the outside and also on the face of the threads. The control tubes are exceptionally large, providing means for overcoming rattle. The column jackets are made of brazed steel tubing which is enameled seamless steel tubing, which is nickel plated or nickel brass iron lined tubing which has a lasting nickel brass casting, the spark lever being fitted with a waterproof electric button for operating the electric horn. The contact and connections are made at the top and wires are run on the inside of the steering gear. The Pitman arm has a nickel steel ball, inserted on a taper. These steering gears are manufactured by the Wilcox-McKim Company, of Saginaw, Mich.



Wilcox Steering Gear

Neglect is the advance agent of grief,---care for your trucks

OXYGEN AS CARBON REMOVER

The expense of keeping a truck will be further reduced by the use of Dy-Karbo, a new system of removing carbon from engine cylinders by the use of oxygen. Formerly it was necessary to "tear down" the motor to do this; but this operation can now be performed in a few minutes by this new outfit.

It consists of a tank of oxygen gas, a sensitive valve and regulator, a reservoir and gage, several feet of pressure hose and a torch. On the end of the torch is a flexible copper tube of small bore and about 18 in. long. With this outfit it is necessary only to remove a valve cap or sometimes only a spark plug, so that the small copper nozzle may be inserted in the cylinder. The tube is very soft and flexible and can be bent so as to reach all parts of the cylinder and valve where carbon is likely to be found.

When the nozzle is inserted in the spark plug hole or valve cap opening the carbon is ignited by means of a taper as soon as the gas is turned on. Since oxygen attacks carbon very readily, the deposit is burned away from the surface of the iron at a very rapid rate. As soon as all carbon has been consumed, the burning automatically ceases, since the gas has no effect the instant the cylinders and valves are clean. The process affects only the carbon and does not attack the metal of the cylinders. In a cylinder where the carbon deposit is extremely heavy, only a few minutes are required to burn all of the deposit away.

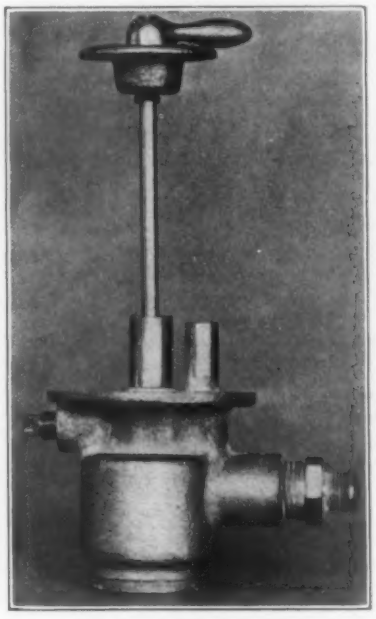
A UNIQUE METHOD OF SECURING AN EMERGENCY GASOLINE TANK

Those who have been stuck on a country road, because they had no gasoline, and those who have found their gasoline tank empty in the morning, because a particle of dirt got under the needle valve and "flooded" the carburetor until all the gasoline ran out, are the ones who will appreciate this unique valve and strainer made by the Breeze Carburetor Company, of Newark, N. J.

This valve is installed at the bottom of the fuel tank, and strains the fuel with a very adequate device as it leaves the sediment cup section for the fuel line. A sediment cup substantial and large enough to contain a quantity of water and dirt that would put a carburetor out of business many times is at the bottom of the valve. The bowl is cleaned by unscrewing the base.

The valve provides an emergency tank incorporated with the main fuel supply or tank. A nipple tube on the valve extends upward as far as necessary to give the purchaser a reserve emergency tank, embodied in the main tank, that does not interfere with the supply from the latter. This reserve nipple forming an emergency tank eliminates an expensive separate tank. The Breeze combination outfit is suitable for a pressure or gravity feed as it is made entirely separate from the inlet cap and can be made air tight at the lever by packing.

This combination of main tank, auxiliary and shut-off is worked with a three-way valve operated by a lever on top of the tank cap, which has marked on it, "off," "on" and "aux." The lever connects by a rod fastened at one end to the lever and at the other to a valve having a ground seat. The lever shuts off the supply of fuel when pointed in the direction of "off." It gives access to the main supply of fuel when the line is turned to "on." The gasoline in this case runs down the reserve nipple through the barrel valve into the sediment cup, and from there through the strainer into the fuel line. With the lever pointing to the "aux" part of the cap the barrel valve is turned so that a hole at the flat or tank bottom is opened through the barrel valve. The fuel is then taken from the bottom of the fuel tank into the sediment cup and from there into the fuel line through the strainer. The connection with the fuel pipe line may be by any standard fitting.



The Breeze Tank Valve
Contains strainer, sediment cup and shut-off valve

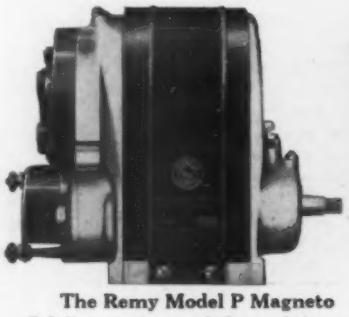
A NEW REMY MAGNETO

A new high tension magneto, to be known as Model P, has been announced by the Remy Electric Company, Anderson, Ind. This new instrument is of the wire-wound armature type producing a dynamic spark of great intensity with a distinct flame characteristic.

The manufacturer claims that this magneto is entirely water and dust proof. The end bearing plates are machined to fit the magnets; the distributor is machined to fit the gear case and packing is used in all joints to exclude water, oil, dust, etc. The distributor terminals are of waterproof design, and at the same time provide a reliable method of securing the high tension cables. The circuit breaker is thoroughly protected by a cover of Bakelite, a heat-resisting material of high di-electric strength. The armature heads are of a special hard bronze. The drive shaft is of high grade steel cast into the armature head, providing a very rugged construction. The armature winding is of cotton covered enameled wire heavily impregnated with Bakelite. The armature shaft revolves on a special magneto-type ball bearing. The bearings are made dust and grit proof by the use of felt washers.

An ingenious device, known as the timing button, is incorporated in the distributor, for the purpose of timing the magneto to the motor. This feature of the distributor brings the circuit breaker into proper position as well as locating the proper terminals of the magneto—thus making simple the usually difficult operation of proper magneto timing. The magnets are made from the finest Tungsten steel especially heat treated and hardened.

The Model P switch is built integral with the coil and also forms a method of attaching to the dash, as will be seen in the cut. The switch face only appears on the driver's side of the dash. In order to securely anchor the coil winding within the tubular fibre case, it is embedded in a compound of extremely high melting point which is not affected by extreme cold. Such coil construction gives absolute protection against vibration, heat, cold or moisture.



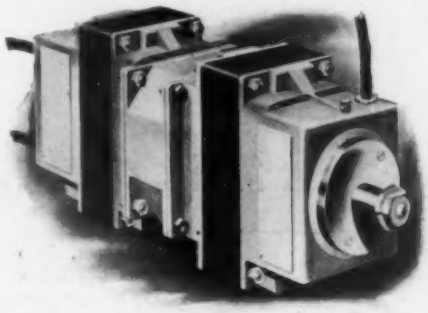
The Remy Model P Magneto
Bakelite, a strong, tough, heat-resisting compound used for insulation

Switch and Coil of the Remy Magneto

ESTERLINE'S NEW LIGHTING AND STARTING SYSTEM

The Esterline Company, Indianapolis, Ind., announce a new model of electric lighting and starting equipment, which they state is their idea of the ultimate development of the electric lighting and starting apparatus as applied to motor cars.

The endeavor in the design of the new Esterline equipment has been to retain the desirable characteristics of separate



Esterline Company's New Lighting and Starting System

The generator and motor are connected by a free-running clutch, while the gear reduction is permanently mounted between the two machines.

generator and motor, and at the same time to gain the simplicity of installation of the combined unit. The Esterline equipment is, therefore, what might be called a combined separate unit. It consists of a multipolar generator and a series wound motor with the ingenious free running clutch and the gear reduction permanently mounted between the two machines. The generator shaft is extended to provide a means of driving, either by gears or silent chain. A gear mounted on the end of the motor shaft meshes with the gear reduction, which in turn is connected with one half of the free running clutch. The other half of the clutch is mounted permanently on the generator shaft.

When the gasoline motor is running it drives the generator in the usual manner, and the motor and gear reduction are at rest, there being no contact or friction in the clutch when the electric motor is standing still.

On the other hand when the gasoline engine is at rest and the electric motor is started, the clutch immediately engages and the electric motor starts the engine through the medium of the drive which ordinarily runs the generator.

The gear reduction and the clutch run in a bath of oil. The frames of the motor and the generator are of the same size, so that the unit can rest on a simple flat base. The field magnets of both machines are made of a high grade of laminated steel so that there are no joints in the magnetic field circuit. The bearing housings and the gear box are made of aluminum. The generator is designed to deliver a charging current at low speed and the motor to have a very high initial and running torque.

In starting it is not necessary to engage any gears or do anything other than turn the current into the starting motor. When the engine is running and driving the car, the motor and all gears are at rest, so that less power is required to drive the unit.

The entire system is operated at 6 volts. The shafts of both machines are made of high carbon steel and are particularly heavy and strong. Large annular bearings are used. The machines are rectangular in shape and are made very narrow in width, being 4½ in.; height 7⅛ in.

When necessity requires, the machines can be furnished separate for mounting, in which case the motor is fitted complete with gear reduction and if desired, the over-running clutch. The wiring scheme is extremely simple, using grounded returns. With the outfit is furnished a flush dash ammeter and the standard automatic cut-out, and the lighting switch, which have been features of the Esterline product for several years.

A SAFETY CRANK FOR TRUCKS

This safety crank operates without ratchets and is being placed on the market by the R. & B. Manufacturing Company, 5525 Woodland Avenue, Philadelphia, Pa.

Referring to the cut shown here, the cylinder A is connected rigidly to the cranking shaft of the motor; girth C grips A by binding friction and turns it when the handle D is grasped and turned as when cranking the motor. A girth E (like C and provided with a lever similar to handle F but anchored to the frame of the car), grips a loose cylinder which is connected to girth C in such a way that, when backfiring occurs, the handle D is prevented from flying back, and the friction grip of girth C on A is released, with the result that A turns harmlessly backward inside of C until the backfire is spent. By a simple place the handle at any angle, allowing one to get a better leverage against the thumb pressure on trip lever G one can

The Rohrer Safety Crank

compression without disengaging the crank claw from the motor shaft. These devices sell at $15.

DOUBLE-DECKER AUTO 'BUS FOR HOTEL

A double-decker auto 'bus, resembling the London tram cars, is being used by the U. S. Grant Hotel, San Diego, Cal., for conveying the guests from the station to the hotel.

This monster auto car is a 90 h. p. Mack and the body was specially built for this purpose by the Western Auto Body and Manufacturing Company, of Los Angeles. It seats 28 people on the upper deck and 22 on the inside, leaving space for hand baggage. The body of the car is 27 ft. long by 8 ft. wide and 13 ft. 6 in. high. It is electrically lighted and equipped with large searchlight, Klaxon horn, and weighs 13,350 lbs.

A special garage had to be built to accommodate this car as there was no garage in San Diego with a door clearance of its height.

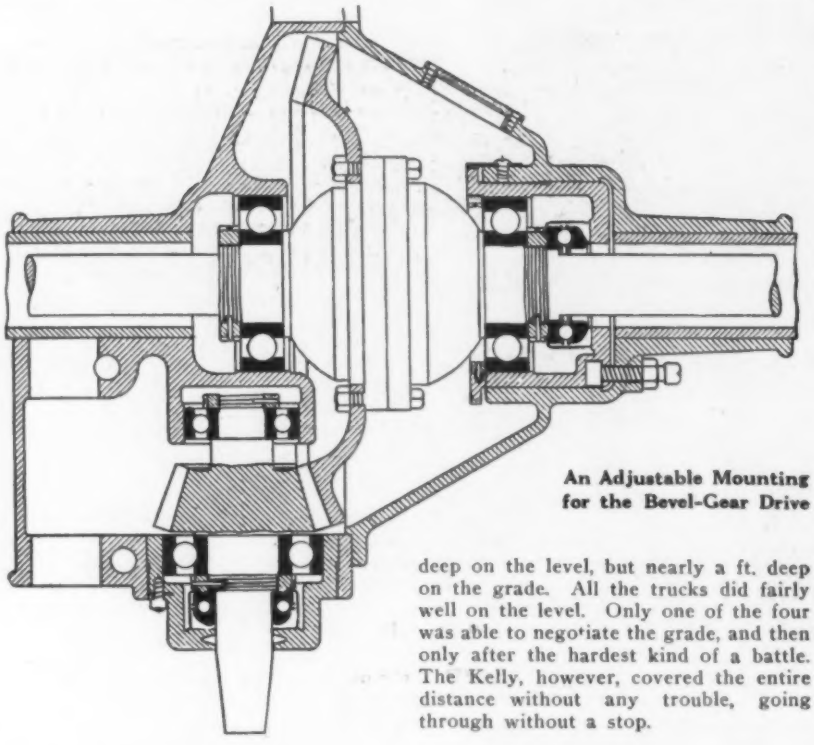
Double-Deck Auto 'Bus for Hotel
Total capacity, fifty passengers

ADJUSTABLE MOUNTING FOR BEVEL-GEAR DRIVE

To the Hess-Bright Manufacturing Company of Philadelphia, Pa., is due this design of an adjustable mounting for a bevel gear drive. This arrangement allows the thrust collars back of the bevel pinion and gear to be adjusted after assembling, in order to make the gear run quietly. Each shaft runs in annular bearings whose outer races are unconfined endwise, only as shown, the thrust being separately carried by ball thrust collars. The smaller bearing of the pinion is carried in the stationary housing. The larger annular bearing is carried in the threaded shell, which also carries the thrust collar. This shell is adjusted in or out by turning with a spanner, and is locked by the clamp screw shown.

The left hand annular bearing carrying the differential casing it carried in a similar shell. Two methods of adjustment are indicated. The one shown below the centre line is to thread the shell and rotate it by a spanner inserted through the opening of the axle housing, afterward locking it by the cap screw and locking tongue shown. The other method is to employ three backing screws with inner heads which carry the shell with them when they are screwed in or out. Owing to the liability of not adjusting the three backing screws equally the former method of adjustment is recommended.

Reverse end play is taken by the annular bearing adjacent to the thrust collar. The outer race of this bearing has .01 in. clearance from the thrust collar to avoid the possibility of binding. It takes the end thrust of the vehicle on right hand curves, and prevents the thrust bearing from opening and dropping the balls after the gears are worn. As the drawing shows, the outer cages of both thrust bearings overlap the clamp nuts. This prevents the aligning washers, spherical seated race sand balls from dropping out of position when the load is released, in case the end play of the shafts should become excessive.



An Adjustable Mounting for the Bevel-Gear Drive

A NEW INTERNAL COMBUSTION MOTOR

The American Semi-Turbine Motor Company has been organized in St. Louis to build and market a new internal combustion coal-oil consuming engine for automobile and other uses. W. G. Thummel, a civil engineer, is the leader in the enterprise and the company's offices are in the Roe Building.

The main features of the engine are the use of coal oil, the turbine fly-wheel exhaust and forced air cooling.

The use of kerosene in this engine is not governed by the ordinary carburetor, but is handled somewhat on the European plan of injecting it into the cylinder in the shape of a heated spray by means of an oil pump.

It is claimed that the advantage of the turbine flywheel exhaust is the muffling of the discharge on the periphery of the flywheel does away with the muffler entirely.

The forced air cooling consists of forcing one charge of the air compressor per stroke around the cylinder walls of the combustion chamber, the air expanding in volume and pressure, and then exhausting on the turbine flywheel, thus assuring a pressure throughout the entire cycle of operation.

Another good feature of the engine is a separate air compressor mounted in tandem with the power cylinder, the charge of air being forced into a separate jacket and then into the working cylinder, where it mixes with the oil spray after both inlet and exhaust ports are closed, thus forming no combustible mixture except in the cylinder. While this engine is built on the two-cycle plan, without cams or valves, it may be necessary to operate on the four-cycle principle by merely injecting oil on each second stroke, as recent tests on a twenty-five horse-power machine which is about completed show that the power is too great when working with an explosion in each cylinder per revolution.

Kelly Motor Trucks recently won a decisive victory in the strenuous tests conducted by the Detroit Board of Education. The tests were held in connection with the selection of a one-ton truck for general hauling for the Board of Education. The Kelly and four other well-known makes of trucks were entered in the tests, which were held over a 2½ mile stretch of sandy road. The road was fairly level, with the exception of about 100 yds., which was up a 7 per cent. grade. The sand was about 6 in. deep on the level, but nearly a ft. deep on the grade. All the trucks did fairly well on the level. Only one of the four was able to negotiate the grade, and then only after the hardest kind of a battle. The Kelly, however, covered the entire distance without any trouble, going through without a stop.

A BOOK ON BALL BEARINGS, THEIR CARE, ETC.

The New Departure Manufacturing Company, Department I, of Bristol, Conn., is publishing a book, "The Ball Bearing Manual," and giving it to automobile dealers and garagemen. It contains suggestions on removing and replacing ball bearings, and their lubrication, enclosure, proper maintenance, cleaning, etc. It also contains descriptions and dimensions of the New Departure single row, radax and double row bearings.

EXCLUDE HORSES FROM PARADE

Automobiles have so far supplanted horses for delivery purposes on the northwest side of Chicago, Ill., that the Northwest Side Commercial Association barred animals from its parade as a part of the "made in Chicago" celebration. When the secretary looked over his list of entrants he found more than 300 automobiles and only eleven horses. The directors feared the horses might "look out of place."

Martin Tractor Company, Springfield, Mass., has issued a circular calling attention to the fact that it now controls almost all the patents on tractors in the United States, including the Martin, Thayer, Hight, Lieban and Hunter patents, and that there is only the one licensee outside of themselves, that being the Knox Automobile Company. The company is capitalized at $350,000.

Brief Extracts of Papers Read at the British Imperial Motor Transport Conference

By OUR FOREIGN CORRESPONDENT

AT the sittings of the British Imperial Motor Transport Conference held during the recent show in London, various papers were submitted. While these touch on many subjects of importance on both sides of the world, they are too numerous to give in detail, but a summary of their chief points may be useful.

THE FUEL QUESTION

Petrol Substitutes for Use in Motor Vehicles

By SIR BOVERTON REDWOOD and PROF. VIVIAN B. LEWES

This was a broad review of present conditions, and probable future developments in petrol supply. Motor spirit was defined as in an easily evaporated combustible liquid, sufficiently volatile for its vapor to form an explosive mixture with air at moderate temperatures.

The following facts prefaced the paper. High price of gasoline is not mainly due to trade combinations and artificial restriction of output, but to vast increase in consumption, and in some countries insufficient transport facilities. That demand exceeds supply is evident from the high price of crude oil at the oil fields. Abundant supplies, and competition between American and Dutch East Indian sources, for long prevented considerable advance in price, but rapid increase of home consumption in America has reduced competition, and sent up prices.

England, France, Spain and Germany have practically no oil fields. In England, imports have risen from eighteen million gal. in 1905 to eighty million gal. in 1912, and probably one hundred million gal. this year. In America, the demand has increased still more rapidly. Last year eighty million gal. used in Great Britain were made up as follows:

Dutch East Indies, forty-six million gal.
America, sixteen million gal.
Russia, five million gal.
Roumania, four million gal.
Other countries, nine million gal.

The world's output of crude oil last year was fifty million tons, but while output has doubled since 1905, gasoline demand has more than quadrupled. Under such circumstances, it is necessary to consider other possible sources of supply. These are:

(1) Parts of the crude petroleum supply other than the gasoline fraction.

(2) Products of destructive distillation of coal and shale.

(3) Products of fermentation.

In most inventions for use of heavy oils with automobiles, 40 per cent. of gasoline is used with kerosene of about .8 sp. g. and several of these carburetors give excellent results with such mixture, but lack engine flexibility where constant slowing down, stopping or starting are requisite. Also, they are apt to be awkward in starting during cold weather, unless arrangements enable them to be started purely on gasoline. By adoption of such methods, a saving of 20 per cent. to 40 per cent. of gasoline consumption can be effected with the commercial car.

The process of cracking or heating the hydrocarbon to a temperature just short of that causing decomposition can give an increase of 30 per cent. and 40 per cent. in the lighter distillates, and such processes are likely to play important part. Turning to the second point, the idea of cracking has recently been applied to the distillates obtained from coal. Tars produced by distilling coal can be classed as, (1) Distilled above 800 degrees C.; (2) Tar distilled below 800 degrees C.

By the second process, a slightly larger fraction of the distillate is suitable for motor spirit. Tars yielded by destructive distillation below 500 C. are even more paraffinoid and suitable for automobile work, and several processes have recently claimed three gallons of spirit from one ton of coal, with a further two to five gallons by cracking the naphtha distillates from the tar. The latter claim is a doubtful one, and although there may be a few classes of coal that will give such a yield, the cost of treatment probably outweighs the advantages.

Much may be done by substituting the old-fashioned beehive recovery ovens, but at present, the benzine supply available is so small that any large demand would send its price up more rapidly than has been the case with petrol.

It is to the third class of fuel obtained by fermentation, upon which countries without natural oil supplies of their own will probably have to depend. Alcohol can be continuously manufactured in any required quantity by fermentation in bulk, and sold profitably at 24 cents a gal.

Extended researches of the United States have shown that engines can work satisfactorily on alcohol, while in spite of calorific inferiority, alcohol gives practically the same power as gasoline, owing to its cool cycle, smaller quantity of air required, and greater possible compression without pre-ignition.

THE SUPPLY OF HYDROCARBON MOTOR FUELS

By W. J. A BUTTERFIELD, M.A., F.C.I.

This paper confined itself to motor fuels from mineral sources, and excluded alcohol, etc.

The range of temperatures in volatilization or distillation of its components is perhaps the most important factor in judging the fitness of a hydro-carbon motor fuel, and this does not depend on the chemical series to which the hydrocarbons belong. There are practically three sources of supply: (1) from shale oil; (2) from the solid fuel in gas works and coke ovens; and (3) from the coal tars and residual oils in gas works and coke ovens.

Scotch shale distilleries yield about twelve to fifteen lbs. of sulphate of ammonia, and twenty-five to thirty gallons of crude oil per ton. Generally speaking, shale working will only pay if, when the crude oil yield falls below the above figure, the sulphate of ammonia production is correspondingly increased. At present motor spirit obtainable from such crude oils equal about 40 per cent. of the whole, but imminent improvements in the cracking process are pending, and the bringing of these into practice may well increase the yield.

Extraction of motor spirit from gas works would reduce the calorific value of the gas by 6 or 7 per cent., therefore extraction of benzol must more than balance the decrease in cost of gas. Under favorable conditions two and a half gal. to three gal. of motor spirit may be obtained to the ton of coal, and generally speaking, such spirit would closely resemble commercial 50 per cent. benzol.

The motor spirit recoverable from gas works and coke oven tar only amounts to .1 or .2 gal. per ton of coal, besides other constituents such as tar oils, pitch, etc., which are all high temperature products, and do not yield any appreciable quantity of spirit by cracking. To carbonize coal so as to obtain larger quantity of motor spirit, low temperature carbonization is used with bituminous coal, the result averaging from fifteen to twenty gal. of tar and oil per ton of coal, and from three-quarter gal. to one and one-quarter gal. of spirit can be distilled, while if the gas produced at low temperature be stripped of its light hydro-carbon constituents, a further yield of one and one-half gal. to two and one-half gal. of spirit may be expected.

Mr. Butterfield estimated the motor spirit recoverable from all the coke oven gas in Great Britain (two gal. per ton of coal coked) at about thirty million gal. a year. The stripping of coal gas in the large gas works of the country would yield about another thirty million gal., while the oil from shale at present quarried in the United Kingdom would be capable of producing another thirty million gal. The feasibility of obtaining motor spirit by low temperature carbonization of coal must depend entirely on the local market value of coal, semi-coke and sulphate of ammonia.

During the discussion on these two papers A. W. Southey (inventor of the gas producer already described in the C. C. J.) pointed out that both in America and England successful results had been obtained by the use of heavy coal tar oils like creosote in high-speed internal combustion engines.

Concerning Professor Lewes's reference of the researches of the United States Government, he pointed out that American manufacturers were far ahead of the English in building an ultra-high efficiency engine, and quoted the b. h. p. test of the Packard engine.

He further proposed a resolution to the effect that the conference considered an adequate supply of motor spirit was available from coal tar oil produced in the manufacture of partially cooked fuel, which latter would be left for the open fires so much used in England.

In opposition to this a resolution was advanced in favor of alcohol and Professor Lewes speaking in favor of this, made a significant point in explaining that the private individual was not likely to have much chance of obtaining supplies of shale oil spirit in view of the requirements of the State for its navy. Here is a state of affairs which may not be confined to Great Britain alone. It was admitted that alcohol was not an ideal fuel, but it was the most promising supply available. Finally Mr. Southey's resolution was rejected and alcohol won.

THE ORGANIZATION OF MOTOR TRANSPORT

By W. TITLEY STEVENSON

To obtain economy a change in organization of freight transport in towns is necessary. To illustrate the point—the horse vehicle costs $500, the motor van $2500 to $4000, the freight train $25,000 or more apart from cost of road way. To yield adequate return on capital in the motor vehicle, it is much more important to avoid keeping vehicles standing idle or running with light loads than with the horse-drawn conveyances. With the train an adequate return can only be earned with very big loads.

Unless cost of motor transport can be reduced, the loads which serve for horse vehicles will be unprofitable for motor vehicles. Big manufacturers or large stores may employ one automobile in place of two or more horse-drawn vehicles, covering the same ground, but for the more numerous smaller businesses this is not possible; the total quantity of transport for each is too small; the solution must lie in combination.

An excellent example of this is seen at Malvern, where the hills are so steep that the individual trader found delivery by his own carts too costly. So the baker's cart delivers in one street, the grocer's in a second, the butcher's in a third and so on. By parcelling out the town for delivery work half a dozen tradesmen combined may effect deliveries at half the cost of independent individual working.

This arrangement, though imposed by physical conditions, is just the sort necessary to meet the new conditions involved in motor transport. To illustrate the point—a road five hundred yards long contains twenty occupied houses. The first part has no houses, most of which are in the last one hundred yards. On the average eight large motor vans came down the road each day and only one called at more than one house. The consignments as a rule were quite trifling and would all have only occupied a small corner of one van, yet four van-miles were run at a cost of some seventy-two cents, where half a van-mile would have sufficed at perhaps twelve cents.

Since the automobile must cover larger delivery areas, it is important that these should be arranged to involve the smallest number of van-miles. Arrangements of delivery areas should be studied not merely to get good loads, but to keep van-mileage down; therefore, individual delivery areas should be kept as small as possible consistent with good loads. To effect this there must be extensive combination among traders, manufacturers and carrying agents, and such combination has already begun.

Great stress must be laid on handling and rapid transit. Take fruit transit, for instance, in which handling is an additional risk of damage; the more frequent the handling, the more careful and costly the packing. With fresh fruit, like strawberries, speed may make serious difference to price, and the author quoted cases in which delays of a few hours had reduced the price by 50 per cent. In such cases a small difference in transport cost is unimportant compared with the essentials of the service. The handlings from railroad to road vehicles accentuate what has been said about packing, and the cost is a steadily increasing one. What breakage occurs to it is not merely a question of value of damage, for the inconvenience to the customer often means far more. Motor transport undoubtedly reduces the percentage of breakages.

At present for general merchandise the limit of profitable distance for motor deliveries is in the neighborhood of fifty miles from the center. Even then there is little chance of economy unless most of the distance can be run with practically a full load. For low-grade goods this distance limit will be much less; for explosive or high-rate freight it may be much higher.

It is, however, in delivery work in our large towns that the greatest benefit is obtained. Only when motor vans dispose of the slow horse traffic will the streets feel the full benefit of automobile transport. At present the faster traffic is increasing in speed while the slow traffic is as slow as ever. Reorganize the traffic so as to make it economical and the traffic problem of many large towns will be solved for at least ten years, probably for twenty.

THE CARRIAGE OF PASSENGERS IN MUNICIPALITIES

By E. A. GREATHED, Managing Director National Motor Cab Company, Ltd.

In establishing motor cab services the following are the most important considerations: (1) Volume of trade expected; (2) Characteristics of locality, e. g., hills, road surfaces, etc. (This is the deciding factor for the power, the nature of the body depending to some extent on climate). (3) Cost of running, depending partly on nature of locality and horse-power vehicle; (4) Fares as fixed by the authorities (probably idle mileage is important); (5) Facilities for getting supplies and labor; (6) Situation of garage with regard to traffic centers.

Organization should be departmentalized, with heads of departments responsible to central authority, and there should be no overlapping; the one department should act as check on another, and whole work passing daily under eye of central authority. Daily, because in motor cab business, decisions have to be made on the instant. Under good management, the business should return the rate of interest to which a "hazardous commercial risk" of this kind is entitled. There is no room for watered capital, or for nepotism in cab work.

USE OF MOTOR TRANSPORT BY THE POST OFFICE, WITHIN THE BRITISH ISLANDS

By WALTER G. GATES, Assistant Secretary to the Post Office

The mail services in Great Britain are run by contractors, and involve at present one hundred and seventy contracts and an expenditure of $694,105, which is 20 per cent. of the total expenditure for mail road conveyance in the United Kingdom. Generally speaking, long distances and heavy loads pay, light loads and short distances, or work involving long intervals between journeys, do not. Among the long distance parcel mail services are those from London to Bristol (118 miles); London and Bournemouth (114 miles); London to Birmingham (109 miles); Birmingham to Manchester (86 miles); London to Dover (85 miles), and London to Southampton (81 miles).

The stores vehicles are owned by the Post Office, who at present have four, two of 3-ton capacity at 12 m. p. h.; two light vans at 20 m. p. h., legal maximum speeds. Last year the four cars ran 56,261 miles at an average cost of 13.2 cents to the mile. Drivers receive $7.60 for a 60-hour week, with protective clothing, and after first year qualified for sick pay and holiday pay. Unlike mail work, theirs is usually performed in daylight. As a result of the working of these vans, horse traction is likely to be discontinued altogether by the Stores Department of the British Post Office.

MOTOR TRANSPORT IN UNDEVELOPED COUNTRIES

The Relations Between Manufacturers and Overseas Buyers

By G. HAMILTON GRAPES, A. M. I. A. E., Wallington, N. Z.

In this paper it was questioned whether British War Office subsidy vehicles could stand up for a week to work conditions outside the British Isles. The War Office specifications involved rigid strength and weight, whereas for Overseas work flexibility, whippiness and lightness were the qualities required.

For reduction of working costs twenty-one requisites were suggested: (1) Reduction of tare weight in relation to engine power. (2) Heavy spirit carburetors. (3) Three-point suspension of power unit. (4) Light large diameter steel wheels of strap suspension design. (5) Tires of larger section in proportion to load carried. (6) Long, many-leaved springs. (7) Absolute dust proofness. (8) Governed engine, and emergency accelerator pedal. (9) Accessibility. (10) Standardization. (11) Minimum of unsprung weight. (12) Chain cases. (13) Single plate clutches. (14) More powerful brakes with radiators. (15) Adjustable truss rods for side frame members. (16) Greater wheel lock. (17) Front wheels in track with rear. (18) Subsidiary shock absorbers. (19) Variable fan speed. (20) Lateral windlass fitment.

POSTAL MOTOR SERVICES

By G. HAMILTON GRAPES

After detailing the motor services in Australia, Austria, France, Germany, Hungary, Italy and New Zealand, the author suggested a postal vehicle following in miniature the lines of the well tried taxicab chassis with a four cylinder, 10 h. p. engine at 1000 r. p. m. and a total weight not exceeding 75 lbs. per brake h. p. In working mails the following suggestions were made: (a) Contracts should not exceed five years' duration. (b) All state owned fleets under control of qualified experts. (c) Lighter bodies. (d) Lower speeds for the heavier vehicles. (e) Larger wheels except in very hilly districts. (f) Heavier tires. (g) Discontinuance of present overloading. (h) One man, one machine.

THE MOTOR AND MILITARY REQUIREMENTS

Motor Vehicles Required on Mobilization by the Chief Military Nations of the World

By CAPTAIN A. P. DAVIDSON, Secretary to the Mechanical Transport Committee

The gist of this paper on the motor organizations of the chief armies of the world is contained in the little table at the end.

Two methods are open for arranging for military motor transport; either the army itself may maintain the vehicles in peace and war, or it can obtain them on emergency from civilian forces either by impressment or subsidy. Italy and Russia are the only great European powers adopting the former method; all the others subsidize. Which methods are adopted largely depend on the number of users of suitable trucks.

The type of truck is decided largely by individual considerations. Germany with its great numbers requires trucks of the largest capacity; the French owing to the frontier roads can afford better speeds. The table mentioned is given below.

MOTOR TRANSPORT FOR MILITARY PURPOSES

By HORACE WYATT, Editor of Motor Traction

This paper pointed out that efficiency will depend on, (a) suitable design and construction of trucks considered individually; (b) suitability to work in fleets; (c) sufficient standardization to help in keeping them on the road; (d) skill and experience of drivers and mechanics; (e) a proper realization of capabilities and limitations of transport columns by those responsible.

(a) Suitable design depends on conditions existing at the likely site of war, but in war time roads are likely to be badly broken up and trucks will have to be capable of standing very rough work. Probable conditions point to ample engine power, specially low gear for heavy work, and ample ground clearance. These are the requisites involved in many undeveloped countries.

(b) is the outcome of (c) and as to standardization it is a nice point how far this pays, for very high degrees of standardization add to cost and involve heavier subsidies.

(d) points to standardization of control arrangements. It is most important that any soldier driver should be able to handle any military motor truck at any time under circumstances of hurry and excitement.

(e) The question of capacities and limitations is regarded purely from the British Empire point of view.

A Good Example of the Use of the Commercial Car Engine for Auxiliary Purposes

One of the Delahaye traveling workshops, recently exhibited in London by H. M. Hobson, Ltd., who are British agents for these well-known French machines. In this example, the engine is utilized to drive the machine tools. Some of these cars have recently been supplied to the British military authorities for the use of their Flying Corps.

MOTOR TRANSPORT IN SOUTH AFRICA

By W. HOY, General Manager, South Africa Railways and Harbors

Light tractors have the advantage over trucks of not being compelled to remain idle during loading and unloading. Owing to absence of large manufacturing houses detachable bodies for lorries are hardly applicable. Most suitable types for South African work are (1) light station omnibuses; (2) 30-35 h. p. vehicles for passengers, mails and parcels; (3) 2-3 ton truck for fast freight traffic; (4) light kerosene tractors for good roads; (5) heavy kerosene tractors for cross country work, 12-25 ton useful loads.

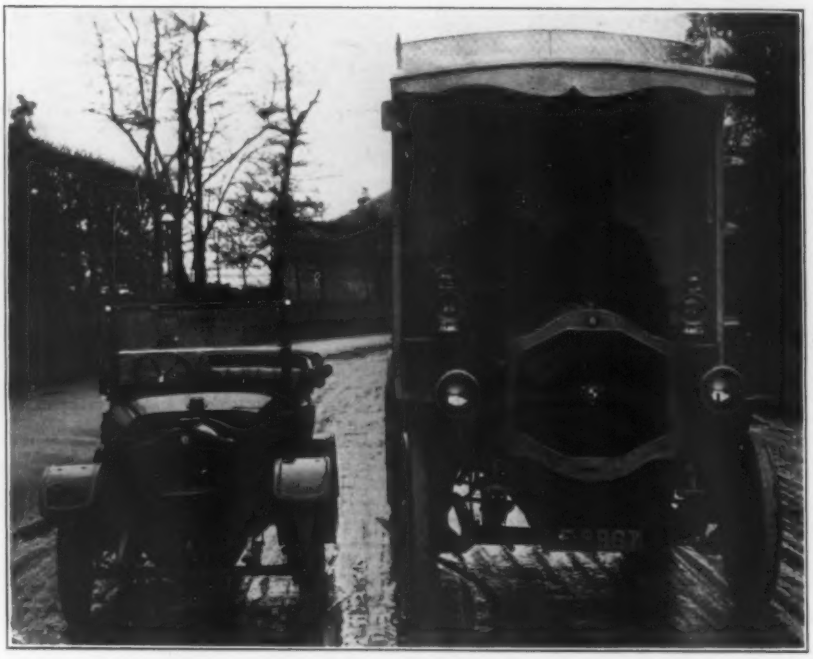
The following table gives some costs of working:

Roads will not permit fast running, and rubber tired vehicles for heavy freight traffic are not practicable where transport has to be done at 8 cents per ton-mile. For passenger and rubber tired vehicles larger and detachable driving wheels were suggested; for freight work, spring wheels with steel treads, the fitting of sprags and the use of kerosene or alcohol as fuel. Excellent results have been obtained with kerosene, which in some respects has held superior to gasoline. Good road clearance is desirable, also high position for magneto and carburetor for crossing streams. Diagonal braking on all four wheels was suggested. Except for the narrow coast belt, the altitude of South African Union varying from 2000-6000 ft. above sea level, and, therefore, a controlled extra air inlet often desirable.

The Cary Spring

In our last issue of the "Commercial Car Journal" mention was made, in an article dealing with the British Commercial Car Show, of the Cary springs; designed to give graduated action according to increase of load. The above illustration of one of these springs explains the principle better than any words.

Boggs & Buhl, Pittsburgh, Pa., have put into operation two motor 'buses to carry passengers to their store on the North Side, which is one of the largest retail stores in the city. Patrons of the store are taken from any point of the downtown to the North Side store free. A regular schedule is being maintained through the downtown streets now, but this will be extended later to take in all the railroad stations. The cars are furnished by the White Company.



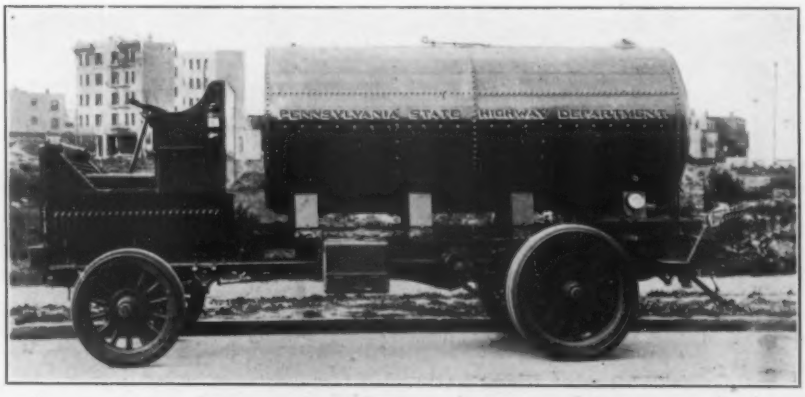
David and Goliath

A couple of views of the largest and smallest commercial cars used by a European firm Goliath being a 35 h.p. van, David a 6 h.p. car; both are De Dion Bouton machines

PENNSYLVANIA STATE HIGHWAY DEPARTMENT HAS ADOPTED MOTOR TRUCKS

For the purpose of transporting liquid road material and keeping it hot during transportation, steel tanks 12 ft. long and 54 in. in diameter having a capacity of 14,000 gals. each are mounted on motor trucks. The tanks are fitted with a rotary pump which discharges 150 gals. a minute. This pump also is used for filling tanks. The tanks are equipped with an exhaust heater which keeps the temperature of the liquid up to 200 degrees Fahrenheit. The material is kept from rolling about in the tank by means of bilge keels and baffle plates. These tanks are used for coating the roads with asphalt or oil.

First Auto Transit Line in America is being operated in Huntington, Ind., upon a regular street car schedule. White gasoline cars are used, of 40 h. p., with special 'bus or transfer bodies, capable of seating about twenty passengers. The cars are of the "pay-as-you-enter" type, the driver making change when necessary, but the fares are placed in a dropper box similar to that used in old-time omnibuses.



Alco Used in Road Building

One of the two five-ton Alco tank trucks used by the Pennsylvania State Highway Department to spread liquid road materials; equipped with a device for keeping the materials hot

The truck will increase your efficiency

How Bakers Make Use of Commercial Cars

Larger Trucks Mostly Used for Long Hauls and Wholesale Delivery, While the Light Cars Take Care of Retail Routes

AMONG the many industries which find the commercial car an economic, rapid and convenient means of making deliveries might be mentioned the bakers. We have probably all noticed that many of the well known large bakeries have been sending out their tasty products via the automobile for a year or so past, but it may be news to a good many of us that nearly all bakers of note and importance are using the commercial car to a greater or less extent.

The delivery of bakers' products probably has no analogy in other lines of delivery owing to the fact that the driver must know his route and be thoroughly familiar with the demands of his customers from day to day as in all cases the driver makes out his requisition the night before and he must be able to gage the demand for the different articles accurately.

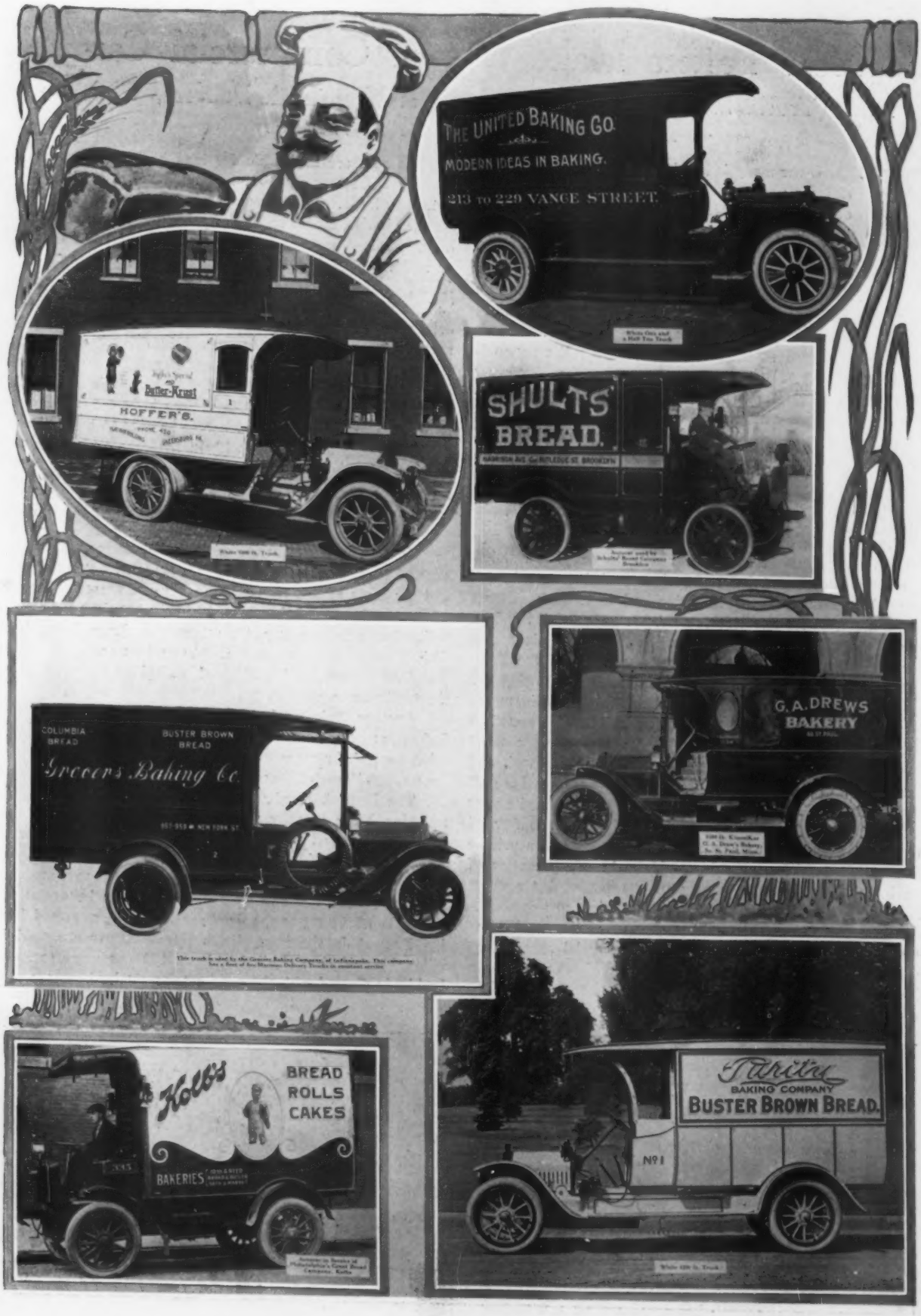
J. S. Ivins Sons, 625 North Broad Street, well known manufacturers of baked goods in Philadelphia, have some White trucks in operation and say that they are very successful. The 3000-lb. cars take routes to outlying districts like Germantown and leave the plant loaded as a rule. A small White is used for irregular and light trips. Horse teams are used for city work, as W. W. Roberts, of the firm, thinks that the commercial cars will never supersede horses for short hauls in the bakery business. All of the Ivins trucks are equipped with recording instruments showing the stops, speed and all movements of the cars. The drivers are men formerly used on the horse teams and are instructed to operate and care for the cars. Any large repairs are cared for at the White garage, in which the cars are stored, and the Ivins people have a contract with the garage to keep all the cars in good running condition. Mr. Roberts raised a very interesting point by asking what was the least number of trucks that could be economically taken care of in a private garage. We think that this would be largely a matter of having the right man in charge of the garage, but perhaps some of our readers could supply information on this point.

The Hutchinson Pie Baking Company, of 3240 Walnut Street, Philadelphia, Pa., has seven commercial cars in service, of different makes, including the White and Autocar. Mr. Shay is the superintendent of deliveries and he thinks that the cars are invaluable for long hauls to Germantown, Frankford, Chester, etc., but thinks the horses are better for short city hauls. The pies are packed in crates having slides for the pie tins, a door on hinges preventing them from jumping around. A wide loading platform the height of the wagon and car platforms is in use, but Mr. Shay says the platform space is becoming cramped. Extra crates on wheels can be loaded and rolled into the cars with very little delay. The drivers are men formerly on the horse teams, who know their routes. They have been instructed in driving and making minor repairs and adjustments to the cars, but any large adjustments are made at the garage. Mr. Shay thinks that shipments of pies by freight to Chester would be out of the question and a horse team would hardly be able to make the return trip every day so that without the commercial cars this route could not very well be continued profitably. It is necessary to drive slowly and carefully with a cargo of pies, as any rough handling would loosen the pies from the tins and break them up.

Taken altogether the Philadelphia bakers seem to be favorably impressed with the trucks for hauls of 5 miles or over and for hauls of less than 5 miles they use horses. One disadvantage from the bakers' standpoint is that the trucks carry a live load only one way, the return trip always being dead. This is probably an expense that cannot be easily overcome. But from the standpoint of speed, reliability and advertising the trucks are a success.

Another Philadelphia user of commercial cars is the Kolb Bakery, at Fifty-sixth and Market Streets, which has in operation several Autocars of 3000-lb. capacity. Freihofer's also have several cars of International Motor make in operation.

The Horn & Hardart Baking Company, of Philadelphia and New York, operates five cars in the former city and two in New York, all of these being made by the Commercial Truck Company of America. The Philadelphia fleet is shown in one of the accompanying page plates. These cars are used to transport supplies and stock from the main bakery at 210 South Tenth Street to the five branches (Automats and Dining Rooms) in the city. No horses whatever are used in either New York or Philadelphia, and the company seems to be highly pleased with the good results obtained.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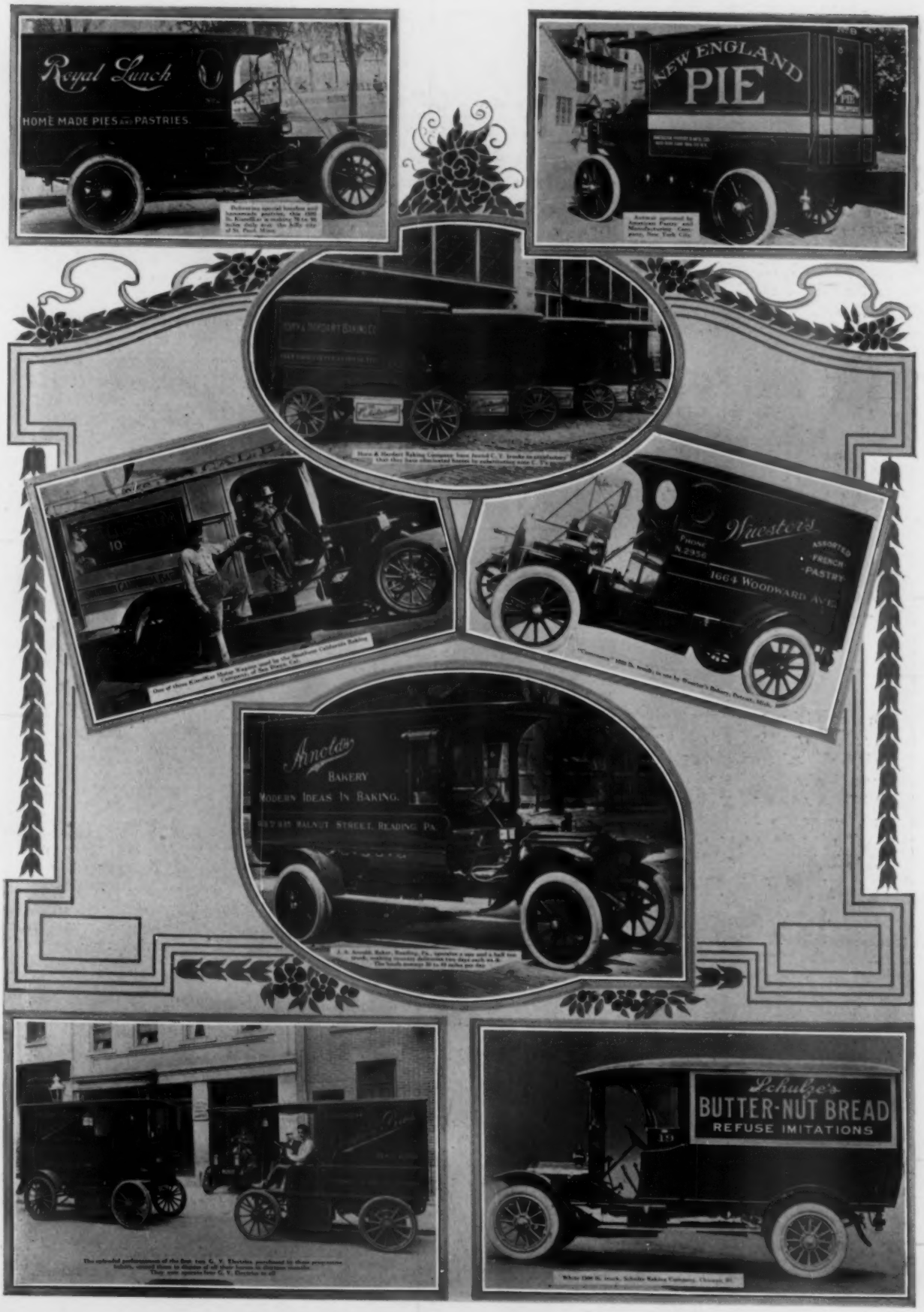
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Some of the Difficulties of Kerosene Carburetion

Extract from a Paper Presented Before the Detroit Section of the Society of Automobile Engineers by P. S. Tice, Member of the Society

MOST of the characteristics of kerosene, as it compares with gasoline, have been discussed of late, notably in the meetings of our several Sections and in the motoring press. Hence, but a brief summary of its chiefly interesting physical properties will suffice at this time.

Kerosene is heavier than gasoline and has a higher viscosity coefficient. It is comparatively non-volatile. Its specific heat is little, if any, higher than that of gasoline; but its latent heat of vaporization is approximately 2.5 times that of gasoline, and apparently lies in the neighborhood of 680 B.t.u. per pound. Its composition, as to range and nature of substances comprising the mixture, is more diverse than that of gasoline; and, as received from the producer and seller, it uniformly carries more, and more widely assorted, foreign matter in suspension.

Of these properties, the first, the greater weight per unit volume of kerosene, is unimportant, except insofar as it is an advantage, in that a greater quantity of energy can be carried in the same space in a car.

The matter of the relative viscosities of the two fuels is an important one, however. Obviously, if mixture proportions remain about the same for the two fuels, a carburetor will be required to have larger fuel orifices for kerosene. In practice this item presents no difficulty; but in the matter of change of viscosity with temperature change, the first great difficulty arises. If we parallel the case of .755 sp. gr. (58 deg. B.) gasoline and .817 sp. gr. (42 deg. B.) kerosene, in respect to increase of flow through a small orifice with rise in temperature, the result is highly interesting. According to Sorel, a French physicist who has done a great deal of research work in carburetion, kerosene of .817 sp. gr. will be discharged from a small-bore passage at twice the rate at 90 deg. F. as at 40 deg. F., while at 140 deg. F. the discharge will be 3.33 times that at 40 deg. F., the pressure differences under which these discharges are made being identical. In the case of the .755 sp. gr. gasoline, if the discharge at 40 deg. F. is taken as unity, that at 90 deg. is found to be 1.30, and that at 140 deg. F. 1.92, with the same head and same passage as in the case of kerosene. In other words, with the same head and same passage for the discharges of the two fuels, the rate of increase in kerosene as compared with gasoline discharge, with a temperature rise from 40 deg. to 90 deg. F., is 1.52; and, over the range from 40 deg. to 140 deg. F., the relationship of the rate of increase of kerosene to gasoline is 1.74.

These facts tend to result in practice in an aggravation of one of the most annoying troubles experienced by the average motorist of today—that of nursing the motor until it and its carbureting system have attained the working temperature conditions under which the latter has been adjusted. The colder the weather, or the more economical the carburetor adjustment, the longer will it take to "warm up."

It is a safe assertion that a carbureting system of conventional type cannot be made to operate flexibly and economically without an input of heat to the mixture ingredients sufficient, or nearly sufficient, completely to vaporize the fuel. This being the case, the range in temperature of the fuel may exceed that noted above; and, if this does occur, the mixture proportions will be greatly disturbed as the result of compartively small temperature variations. This effect may be further aggravated in the case of kerosene, as compared with gasoline, because of the fact that a wider variation of temperature values may be experienced in a heated carburetor using the former fuel.

Even with the extensive heating practiced today in gasoline carburetors, a temperature of 100 deg. to 120 deg. F. is seldom exceeded. In kerosene devices of conventional type the temperatures of the mixture ingredients will often approach three times these values. The foregoing explains in part the difficulty experienced in securing compensation or proper automatic control of the mixture proportions in the conventional type carburetor to which heat is applied to adapt it to the use of kerosene.

The relative specific heats of the two fuels have only an indirect bearing on the matter of carburetion. There is not over .04 B.t.u. per pound difference in the two cases. However, since the boiling or vaporizing temperatures of kerosene are consistently from 2 to 2.5 times higher than for gasoline, it follows that 2 to 2.5 times the heat input is required to bring kerosene to the temperatures where vaporization begins.

But even this difference in the two fuels is of comparatively little moment, in view of the difference existing between the latent heats of vaporization. As stated, the value of this quantity, in the case of kerosene, is approximately 680 B.t.u. per pound. This brings the total heat of vaporization of kerosene, from an initial temperature of 40 deg. F., up to approximately 900 B.t.u. If complete vaporization is sought in the intake system, this very considerable heat input, in the short time available, means the employment of high temperatures—temperatures so high, in fact, that unless the means of their application is very well thought out, prohibitive difficulties will be encountered.

It should be noted at this point that the difficulties alluded to are almost wholly attributable to the heterogeneous nature of the compounds composing the mixture known as kerosene. They are not all of one series, nor of two series, but are, apparently, haphazard compounds resulting from the cracking and other treatment of the oils from which we ordinarily speak of them as having been distilled. Whatever the causes are, the fact remains that certain of the compounds entering into the mixture known as kerosene are easily broken down to form others and to free some of the carbon. This can readily cause choking in the passages, which will, in a short time, interfere with the operation of the carbureting device. The foreign matter seems to be largely capable of removal by mechanical means; but certain samples have been found to contain minute particles of waxy or paraffin-like substance, readily seen under the microscope, even after the ordinary careful filtering through chamois. Ordinarily these particles are flaky and translucent, and appear to be clean. But if the fuel is subsequently heated to vaporizing temperatures, these waxy particles become grouped in sufficient numbers so that they can be seen with the unaided eye: and the microscope shows them to be shot with single and nested particles of carbon.

Relative Nonvolatility

The relative non-volatility of kerosene is the property that has proven to be the greatest stumbling block in the development of a commercial kerosene carburetor. It is a practical impossibility to start a cold automobile motor on kerosene, with a cold carbureting device, and an ordinary system of intake piping for the distribution of the mixture. Poor as are the present grades of gasoline, it is no great matter to get started under even the most adverse temperature conditions that we experience in this latitude. There are certain of the components of 58 deg. B. gasoline that volatilize below 50 deg. F. It is true that they are present in small quantity, but after enough of them has been pumped into a motor, by aid of strangling or other means, a start is the result; and the subsequent heating of the motor does the rest.

In the case of kerosene, however, the first members of the mixture to vaporize do not do so below 135 deg. to 140 deg. F. Hence the futility of attempting a cold start on kerosene.

Tests Results

In the following it will be attempted to present some few of the interesting and generally applicable results of a preliminary investigation of kerosene fuel undertaken late last year in the laboratory of the Holley Brothers Company. The first steps in the investigation proper delt with the conditions necessary of fulfilment to secure the starting of a cold motor directly on kerosene. The motor used was of one of the best known four-cylinder bloc constructions, bore 3.75 in., and stroke 4 in. A simple T manifold with short common branch was used; and attached to its flange was an 18 in. length of .50 in. o. d. copper tube, having a bore of .4375 in. This tube was arranged vertically, and its lower or intake end was adapted to take a series of throat pieces of approximately

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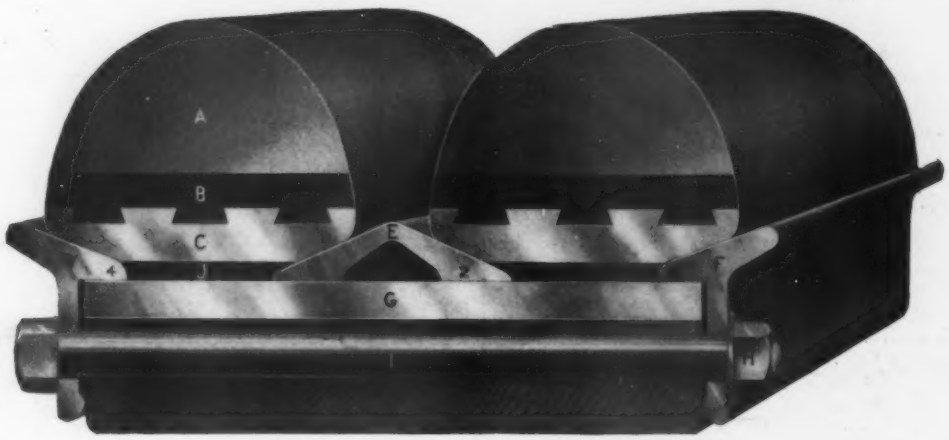

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TOLEDO, OHIO	U. S. Tire Co.	218 North Erie St.	
WASHINGTON, D. C.	U. S. Tire Co.	1303 H Street, N. W.	
WILKESBARRE, PA.	U. S. Tire Co.	60 North Main St.	
WORCESTER, MASS.	U. S. Tire Co.	Graphic Arts Building	

UNITED STATES TIRE COMPANY

WORM GEARS

Announcement

The making of worms and worm wheels is a difficult art, and only men of long experience are capable of correctly making this drive. With this in view we wish to make this announcement to the motor trade:

FIRST. We are the only people in America who have the experience to advise you correctly.

SECOND. We have the only machines in America that will cut worm wheels theoretically correct.

THIRD. We have the only engineers in America whom you can consult with safety as to your mountings and general assembly.

FOURTH. We are the only makers in America with many years of experience.

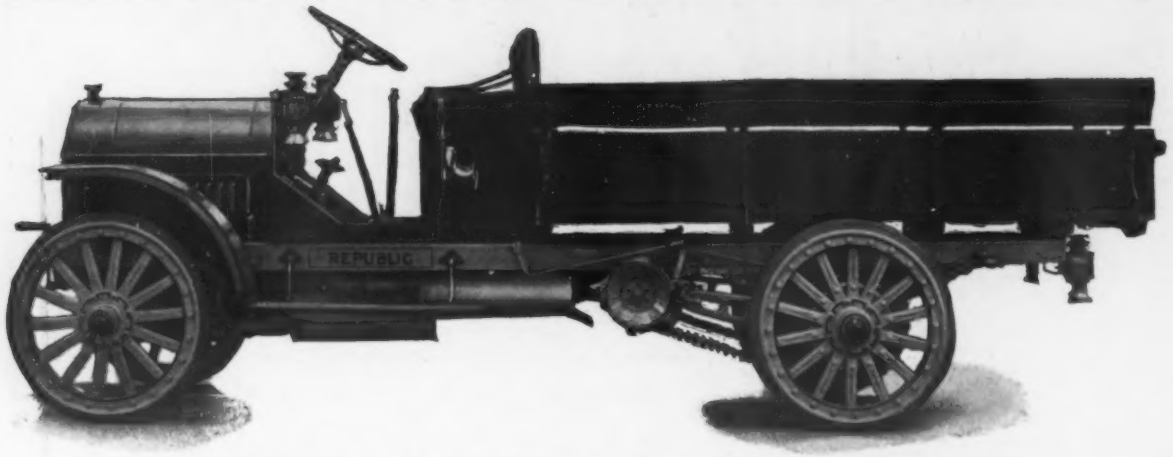
FIFTH. Give us the horse power of your car, approximate speed of the driving shaft, ratio required, and approximate weight of the machine, and let us send you a blue print of what we would recommend.

SIXTH. Why experiment with experimenters?

The Cleveland Worm and Gear Co.

988-992 E. 67th St. :: :: CLEVELAND, OHIO

REPUBLIC MEANS SERVICE



Republic Truck Fitted With Standard Express Body

DEALERS: WARNING

The opportunity to sell a truck embodying such high-class parts, acknowledged best and standard, as are found in the REPUBLIC truck, at such a low price, is unprecedented.

There were plenty of wise dealers—big men of reputation and experience—who sensed the great possibilities in handling the REPUBLIC and lost no time to secure the agency for their territory.

By mail, by wire and in person they clamored for territory and in a short time following the announcement the bulk of our output was sold.

Such high quality at the price was possible only by quantity production. We, therefore, can take care of a few more agencies—but quick action is necessary.

This advertisement is a warning to act ***now*** if ***you*** want to handle this remarkable truck. Delay may be fatal, for ***your*** territory may be taken or the entire output sold. Play it safe and ***wire*** today.

Specifications:

Continental Motor
Schebler Carburetor
Eisemann Magneto
Russel Jack Shaft

Bower Roller Bearings
Hartford Joints and Clutch
Culver-Taylor Chains

Covert Transmission
Lewis Springs
Left-Hand Drive
Center Control

Capacity, 1500 to 2000 lbs. Body, Stake or Express. Price, $1425

ALMA MOTOR TRUCK CO.

Factory, Alma, Mich. General Sales Office, 870 Woodward Ave., Detroit, Mich.

Export Office, 17 Battery Place, New York

RADIATORS

Long Radiators have become standard equipment on many high-class cars because of the efficiency of their radiation.

All requirements are met with two types—the Honeycomb for commercial cars and medium sized trucks, the spiral tube for heavy trucks and tractors.

Each type embodies certain distinctive features which place them far in advance of other radiators in the performance of their given tasks. They will give satisfaction on your cars, or if your cooling problems present unusual difficulties our experts will gladly advise you on proper radiation.

Proper cooling is essential to the efficiency of every car. Hence the question of radiation becomes a most important one, for an overheated engine not only cannot properly perform its functions, but is a great detriment to itself.

True of any car, it is particularly true of the heavy commercial truck, which, by reason of the great load it must carry, demands more work of the engine than does a pleasure car.

This problem has been attacked by our engineers with such success that

LONG MANUFACTURING COMPANY
DETROIT, MICH.

Standard

MADE IN DETROIT

THIS is the age of the SPECIALIST. It is a recognized fact that an organization concentrating their entire energies on a SINGLE product, can make a better article at a LOWER PRICE than one that makes a variety of articles.

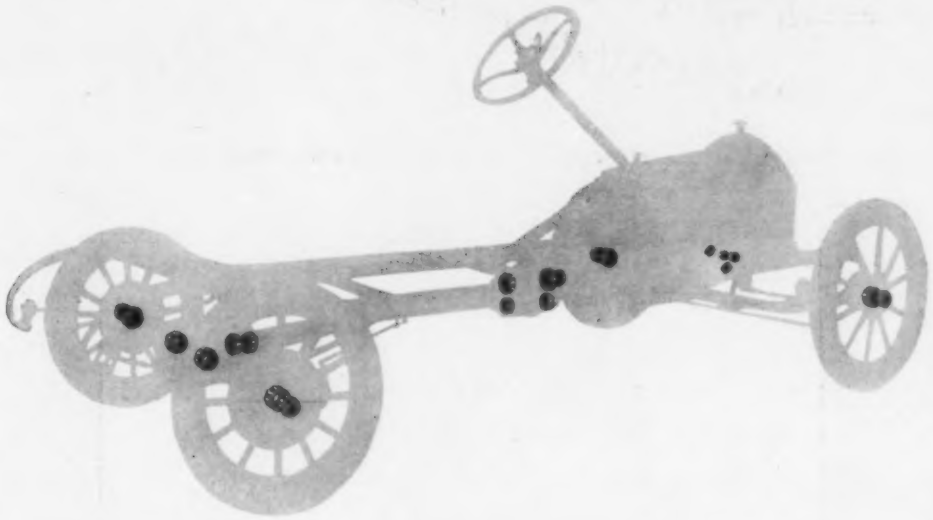
We are Specialists on 3-Ton Trucks

Likewise the great organizations which produce the component units of the **STANDARD** Truck are specialists in their respective lines. The **STANDARD** is an **ALL-STAR** assembly of the products of the world's most famous specialists. It contains such well-known products as—Continental Motor; Timken-Detroit Axles and Jack Shaft; Brown-Lipe Transmission, Clutch and Control; Gemmer Steering Gear; Perfection Springs, and Spicer Drive Shafts and Universal Joints. It embodies nothing but **STANDARD CONVENTIONAL DESIGN IN ALL PARTS.** No "Features," no new "Ideas," no unproved "Theories"—just **STANDARD** in **EVERY** detail. This policy of Concentration and Specialization, makes it possible for us to produce a Superior 3-ton truck at a very low price.

3-Ton—$2750

Standard Motor Truck Company, Detroit, Mich.

"BOWER SAVES POWER"



Twenty-one Places
Where "Bower Saves Power"

Location of Bower Bearings

4 in front wheels
4 in rear wheels
2 in differential gear
2 in propeller shaft
5 in transmission
4 in steering gear

21 total

The real power of an automobile is not that of its motor. It is the amount available after friction has taken its toll.

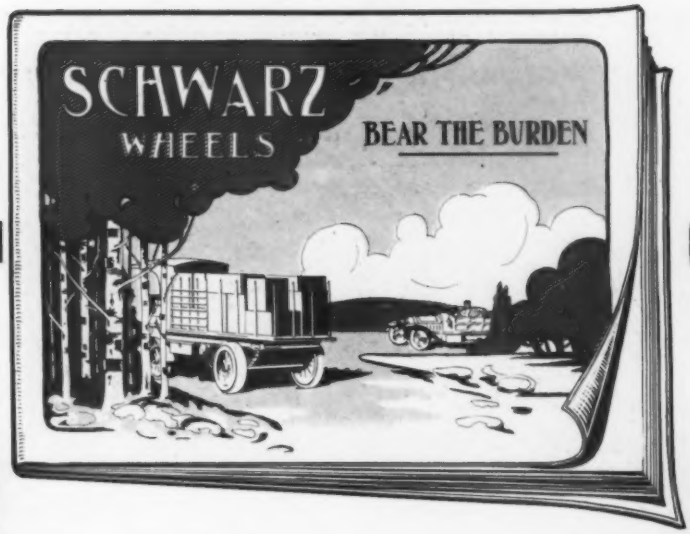
There are 17 principal places in an automobile where friction robs it of its power. There are besides four places where the power of the driver in steering may be wasted.

Friction is the thief of power.

Bower Roller Bearings are Power's Guardian, because through their original design, a maximum diameter of roller is permitted, the rollers are self-aligning and the bearing never needs adjustment.

These are exclusive features.

Bower Roller Bearing Company
Detroit, Michigan



LOOK OUT FOR THE WHEELS!

This booklet, "Bear the Burden," will give you a clear conception of heavy motor-vehicle wheel construction, design and necessities. It is yours for the asking—sent free, post paid.

In buying a motor vehicle, in operating it, or in designing and building it, careful regard must be given to the character of construction and the quality of the wheels; otherwise, the whole superstructure is in danger. The wheels are the real burden bearers; they take all the stresses and strains, and carry all the load. They must be strong, safe, and lasting to preserve the efficiency of the vehicle.

That Schwarz Wheels are **STRONGEST, SAFEST** and **MOST ECONOMICAL,** is evidenced by the fact that nearly all the leading commercial vehicles are equipped with them. The ends of the spokes dovetail and interlock, forming a rigid, immovable center assembly, which cannot loosen, get out of shape, or cease to run true. This feature of construction eliminates the trouble to which other types of artillery wheels are subject, and insures absolute reliability.

Are your trucks equipped with SCHWARZ WHEELS? If they are not, send to us for "Bear the Burden". It will interest you.

The Schwarz Wheel Co.

Frankford, Philadelphia, Pennsylvania

A STANDARD BODY, PRICE COMPLETE, $1850. With Other Body Styles, $1775 to $1850

BROWN

COMMERCIAL CARS

Which will you have—a real commercial car or a pleasure car equipped with a commercial car body? There is a vast difference between them—not so much in appearance as in the service you get. It's a difference that touches your pocketbook nerve. If yours is a little sensitive, it behooves you to get the Brown—a real commercial car.

Every reason for the purchase of a real commercial car that appeals to the buyer appeals with even added force to the dealer. You must either handle such a car or compete with it, and it's a great deal easier and far more profitable to swim with the tide than to try to stem it. In the truck field the tide is running strongly for the greatest efficiency at the least cost, and that is why the Brown is in such high favor.

The Brown Commercial Car will stand the most searching investigation. Test it by its performance; by its construction, both of materials and design; by its cost of maintenance; by its ease of operation; by the service it gives, and you will find it a car that will prove its worth and value on every occasion. It's the kind of car that's a pleasure to sell, because you know the only kind of comeback you will have will be a call for more cars.

Live Agents who want to handle a commercial car that is a service giver and business builder should lose no time in investigating the Brown. We can prove to you that it has rich possibilities in your territory. Ask us about it today.

BROWN COMMERCIAL CAR CO.

PERU, INDIANA

POLACK TYRES

CROSS SECTION

Do You Figure Cost Per Tyre or Cost Per Mile

SHORT-SIGHTED TRUCK OWNERS and MANUFACTURERS haggle over first cost. *The man who knows* bases his calculations on actual mileage.

That is why LARGE TRUCK OPERATORS use POLACK TYRES. The best Para Rubber in the compound and the 20% excess cushion on the tread combine to insure maximum resilience and wear.

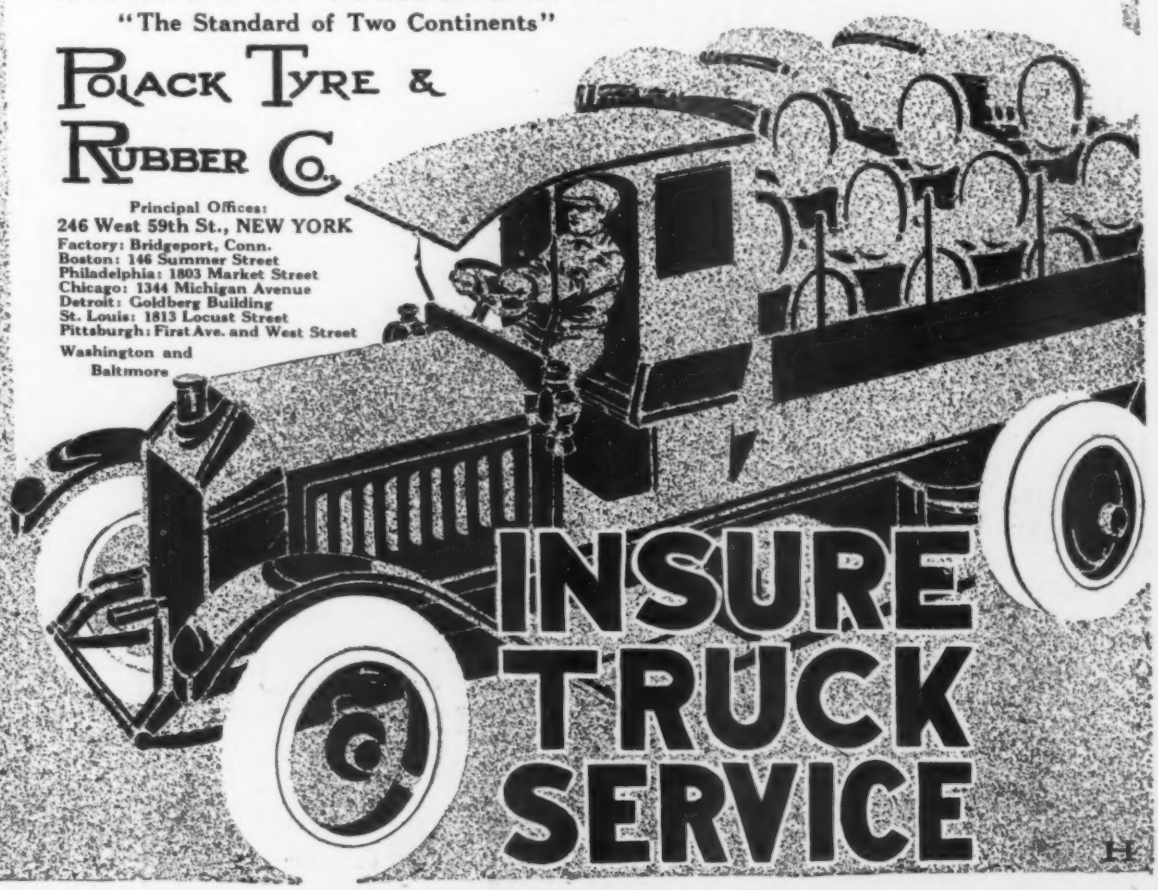
POLACK TYRES always exceed their 10,000 mile guarantee and in many cases cover from 15,000 to 20,000 miles.

POLACK TYRES are 10 years ahead of the field in experience. They can not be equaled for service and prove the axiom that "the best costs less in the end."

"The Standard of Two Continents"

POLACK TYRE & RUBBER CO.

Principal Offices:
246 West 59th St., NEW YORK
Factory: Bridgeport, Conn.
Boston: 146 Summer Street
Philadelphia: 1803 Market Street
Chicago: 1344 Michigan Avenue
Detroit: Goldberg Building
St. Louis: 1813 Locust Street
Pittsburgh: First Ave. and West Street
Washington and Baltimore



INSURE TRUCK SERVICE

H

HYATT QUIET BEARINGS

Line Contact *vs.* Point Contact

THE fundamental advantage of the roller bearing over the ball bearing lies in the fact that it has a line of contact as against the point of contact of the ball bearing.

The great increase of contact thus affected lengthens the life of the bearing by reducing the duty on the operating surfaces.

This basic principle is carried even farther in the Hyatt Roller Bearing by the use of a flexible roller that relieves the shafts and gears of excessive strain.

Vibrations that are ordinarily transmitted by other types of bearings are cushioned and absorbed by the Hyatt. It is this feature of the Flexible Roller that reduces noise.

HYATT ROLLER BEARING CO.
DETROIT. MICHIGAN
WORKS, NEWARK, NEW JERSEY

In the CROCE Truck

Original Design

Bosch Magneto
Brown-Lipe Transmission
Timken Axles & Bearings
Schebler Carburetor
Spicer Universal Joints
Wisconsin Engine
Schwarz Wheels
Croce Pat. Radiator
Kells make

These are some of the reasons why

Croce Motor Trucks

are noted for their efficiency and durability

No truck can be better than the parts of which it is composed. Unless those parts are of the highest quality it is impossible to get the efficiency and service which the purchaser expects and to which he is entitled.

Therein lies the great difference between the CROCE and the ordinary truck. Go over the car part by part and everywhere you find quality, where in the average truck you find mediocrity.

This is in line with the CROCE policy to give the greatest service at the lowest possible cost per mile. This can only be done by using parts of proved worth, whose reputations for efficiency and durability are established beyond question. It makes the first cost a trifle more, but its ultimate cost far less than those in which cheapness was the principal factor.

The CROCE is a good car for dealers to handle, because it backs up in performance every claim that we make for it. Its reputation for service is established and its durability is unquestioned. Selling a CROCE means a satisfied customer. Write for complete specifications and selling proposition.

Send for Catalogue A

Croce Automobile Co.
Asbury Park, N. J.

When Writing, Please Say—"Saw Your Ad. in the C C J"

To Dealers and Garage Men

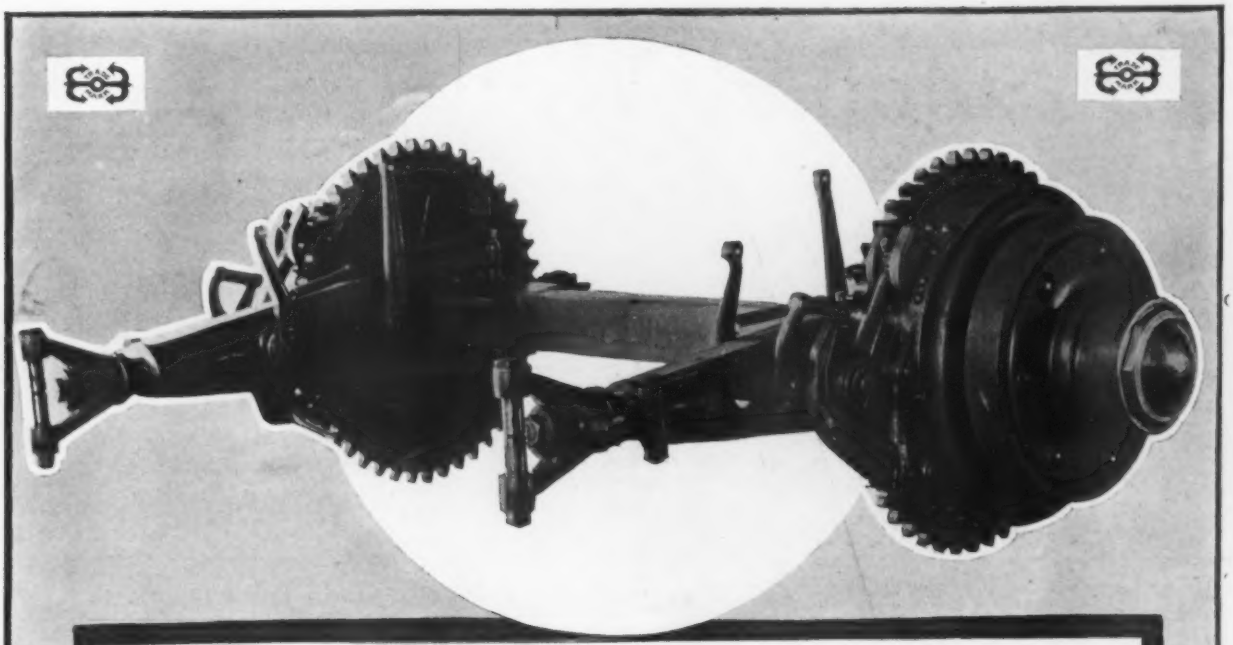
This book is for you, particularly—

full of practical suggestions on the proper methods of removing and replacing ball bearings, cleansing, lubricating, inclosure, maintenance, etc, etc., prepared by our engineers, several of whom have had garage experience. It is a *real* manual and is worth real money to you. We will send it free if you address your request to

DEPARTMENT I

The New Departure Mfg. Co., Bristol, Conn.

Western Branch, 1016-17 Ford Building, Detroit, Michigan



Insist on Brakes Where Brakes Should Be — Next the Wheel

Efficient brakes are most certainly necessary; but proper location for the brakes is every bit as important.

SHELDON DOUBLE BRAKE REAR WHEEL EQUIPMENT has extraordinary features—both brakes are on the rear axle taking all the strain from the chain and doing away with 90% of the Jack-Shaft trouble. One set is operated by pedal—the other by lever.

The reaction due to the frictional force on the brake surface should be as close to the road wheel as possible. The closer the point of application of the brake force, the fewer the parts subjected to strain. This means a more efficient truck and increased safety both for the operator and for the public.

When you cut down to the minimum the number of parts subjected to strain you increase the efficiency of the brake. Obviously, the shortest distance between two points is the most effective designing.

Why then, Mr. Engineer, do you still burden your mind with consideration of propeller-shaft, bevel-pinion, ring-gear, differential-housing, differential-gears, and with their bearings and drive-shafts, when SHELDON DOUBLE BRAKE REAR WHEEL EQUIPMENT relieves you of all these considerations—and makes your final product a *quality* truck with infinitely greater sales possibilities?

Write us today for further information on this vital subject of efficient braking

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

CHICAGO OFFICE: 68 E. 12th ST.
SAN FRANCISCO OFFICE: 444 MARKET ST.
DETROIT OFFICE: 1215 WOODWARD AVE.

12-2-H

"Equipped With Edison"

This 5-ton truck made three trips from the Brewery to South Chicago on Monday, August 4, 1913.

Total distance traveled, 64.3 miles.
Left in Battery at end of day, 7 miles.
Boost at noon, 30 minutes.

LOADS:

Trip No. 1—33 bbls., 2 half bbls. of beer —approximately 6½ tons.
Trip No. 2—29 bbls., 8 half bbls.
Trip No. 3—33 bbls.

An even hundred barrels delivered. 20 Tons on a 20-Mile Route.

The Manhattan Brewing Company of Chicago owns this 5-ton G. V. truck. It is one of an order of five.

The Edison Storage Batteries are guaranteed to be capable of developing their full rated capacity at the end of four years.

Edison Storage Battery Company

141 Lakeside Ave.
ORANGE, N.J.

Write for information on the Edison Storage Battery and also for Bulletins on the Edison Alternating Current Rectifier for Charging Ignition and Lighting Batteries

Capacity One Ton

Any Style of Body

"LITTLE GIANT"

EVERYTHING THE NAME IMPLIES

A giant in performance but a dwarf in maintenance. Great carrying capacity, but low cost of upkeep. Remarkable value but very moderate price. These are the three great factors wanted by every keen motor truck buyer. You get them to a remarkable degree in this proven success which is making good everywhere and in every line of business.

DEALERS

This is a car that will be profitable for you to handle. Here are a few reasons why it will put dollars in your pocket — Its unusually good value; its price is within every merchant's reach; its cost of upkeep is small; it is giving absolute satisfaction in scores of different lines of work and to thousands of owners; there is but one chassis, to which can be fitted every style of body — hence requires but a small investment on your part; it is backed up by a powerful company whose reputation and integrity stand back of every sale; it is a rapid seller, a sure repeater and a good profit earner. Some territory is still vacant — write today for our proposition.

WRITE FOR PRICES AND TERMS
ADDRESS DEPARTMENT "M"

CHICAGO PNEUMATIC TOOL CO., General Office, 1031 Fisher Building

Branches Everywhere. New York Office, 50 Church Street

When Writing, Please Say—"Saw Your Ad. in the C C J"

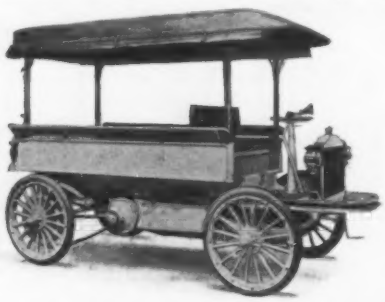
KOEHLER

ONE TON TRUCK $750.

An Unequaled Opportunity for Live Energetic Dealers

Greatly increased manufacturing facilities enable us to make the unprecedented announcement of a new *One-Ton Truck to sell at $750.* Live dealers will recognize in this, one of the greatest opportunities ever offered to make a Quick Success in the truck field. This new KOEHLER unquestionably offers the

Greatest Value at the Price Lowest Price for the Capacity



Never before has a one-ton truck been offered at this price or anything like it; never before has such value been given. Can you find a single one-ton truck that is sold for anything like this price? Not one—nearly all of them cost about double.

Think of the selling opportunities that lie before you in offering a *tried, proved, successful* truck for about *one-half* what your competitor asks for one less favorably known.

Who couldn't control the small truck business of his town with such an offering? Who couldn't make his bank account grow fat with the profits from selling such a remarkable value?

Any energetic dealer can make an unparalleled financial success on a small investment handling this little Napoleon of the truck world. The pertinent question is—"Will it be you or one of your competitors?"

There's going to be a harvest for *one* dealer in the light truck field in your town and hard sledding for the rest. Be wise and see that you are *the one* to do the reaping. Write—no, wire for territory. Writing may lose you the opportunity

NOTE—The principles of construction that have made hundreds of Koehler cars please their users during the past two years, are retained. Merely the adding of additional strength, results in our being able to guarantee the car for one ton capacity.

Increased production has made many savings possible. That's why the price remains the same—$750.

H. J. KOEHLER S. G. COMPANY

1709 Broadway, New York

New Prices Open Up Bigger Markets For Stewart Delivery Trucks

ARE YOU getting the full benefit, Mr. Dealer, from the sales opportunities presented by Stewart Delivery Trucks at the new prices—$1,500, chassis price?

The reduction in price—made possible by increased output and improved manufacturing facilities—widens the already large market for these splendid delivery cars.

Every retail store now using two or more horses is a "prospect" for Stewart Delivery Trucks. Are YOU or YOUR salesmen calling on these "prospects"? Have YOU a Stewart demonstrator to show them?

Good Profit for Wise Dealers

Scores of the most successful dealers in the country are making money selling Stewart Delivery Trucks. Already hundreds of these cars are in use in sixty-five of the leading cities of the United States and Canada.

These cars are saving money for the merchants; they are making money for the dealers. Every Stewart car sold is a moving salesman, helping to bring in more orders.

A Quality Truck at a Medium Price

Wise merchants are learning that it pays to buy good trucks—like the Stewart. Many who have tried cheap trucks and rebuilt touring cars have learned their lesson and are turning now to *real* delivery trucks, built to last.

In no truck but the Stewart can you get such high-grade features as those listed below, every one standard, every one used by trucks of the highest price. Note these features.

CONTINENTAL MOTOR
30 H. P., 3¾ x 5¼ in.; BOSCH MAGNETO, TIMKEN AXLES, BROWN-LIPE TRANSMISSION, GENUINE HONEYCOMB RADIATOR.

With these fine features and a number of recently added improvements, the Stewart offers all that merchant and dealer can desire.

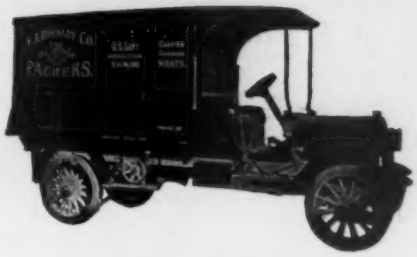
Send for literature and dealer's proposition. We know we can put you in the way of profitable business.

Stewart Motor Corporation

BUFFALO, N. Y.

T. R. LIPPARD, Pres. and Mgr. R. G. STEWART, Vice Pres. and Chief Eng'r
R. P. LENTZ, Sec'y and Treas.

Separate and distinct from any other truck company using our name or the names of our officers



Dependability
IS WHAT SELLS THE
ROWE MOTOR TRUCK

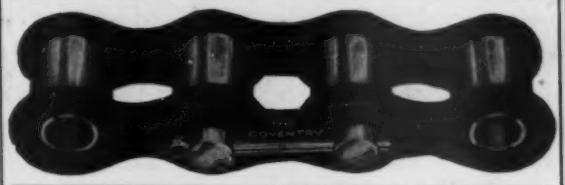
and enables you to increase your business after you have bought one.

The price is right—we do not have any expensive overhead charges that you have to pay for, and the Rowe factory is less than an hour from Philadelphia. The weather does not affect the Rowe; it is built for service **all** the time—24 hours a day when needed.

Worm or chain drive. Built in 1 to 5 ton sizes.

Philadelphia Branch—647 N. 42nd St.

Rowe Motor Manufacturing Co.
COATESVILLE, PENNSYLVANIA



"The Coventry"
Detachable Roller Chain

Note the large heavy-duty cotter-pin connecting the two rivets. The mechanical superiority of this method of coupling can easily be appreciated. Vibrations and jars cannot weaken the double-size coupling as is the case where two smaller cotter-pins, one for each rivet are employed.

Combine the established reputation of "The Coventry" Chains for precision, perfect retention of pitch and unparalleled durability with this final touch of perfection and you will understand why "The Coventry" Chains are consistently specified by those desiring the maximum of transmission efficiency.

Our catalog comprehensively covers "The Coventry" line, and will be sent immediately upon request.

Herbert F. L. Funke Co., Inc.
Dept. V 116 Broad Street New York

ROSS
STEERING and DIFFERENTIAL
GEARS
are standard on good motor truck construction

WRITE FOR CATALOG

ROSS GEAR & TOOL CO.
790 Heath St. :: Lafayette, Ind.

Make your motor truck as easy to handle and as economical in upkeep as a pleasure car, by installing

SIMPLE—STURDY—ACCESSIBLE

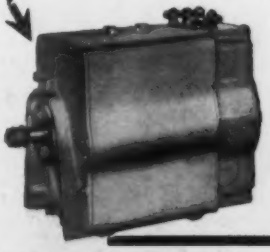
Dyneto-Entz
TRADE MARK

Electric Starter and Lighting System

Don't expect your driver to break his back cranking a big engine. He would rather let the motor run from morning till night. **You pay for gasoline—he doesn't.** When your truck stalls on the road or in traffic, think of the time it takes the driver to get under way again.

Give Your Truck Driver the Dyneto-Entz Starter

The truck manufacturer can make room on any new car for the Dyneto-Entz. On an old car a garageman or mechanic can find room for the Dyneto-Entz. One Switch does away with all other controls. A single unit motor generator not only starts the engine every time, but keeps the storage battery charged. The storage battery can not be overcharged. The wiring is simple.



The Dyneto-Entz means that you never have a Stalled Car. Standard Equipment on Franklin, White, Tribune, Stewart, Chase and Other Cars.

Write for Full Particulars

Dyneto Electric Co.
Dept. M SYRACUSE, N. Y.
Sales Agent: T. J. WETZEL, 17 W. 42nd Street, New York City

Motor Truck Bodies

Special bodies designed and built on contract for qauntities.

Our Engineering Department is at your service. Let us submit designs and estimates.

The Highland Body Mfg. Co., Cincinnati, O.

KING 3½ Ton Truck

There is no question as to the quality and efficiency of the King. This means low cost of maintenance. If you want a truck that will do real work and stay on the road, it will pay to investigate.

We can give you the service

Territory for reliable agents

A. R. KING MANUFACTURING CO., Kingston, N. Y.

Spicer

Universal Joints

***For* Commercial and Pleasure Motor Cars**

Consult our representatives:

K. Franklin Peterson, 122 S. Michigan Blvd., Chicago
Thomas J. Wetzel . 17 West 42nd Street, New York
L. D. Bolton, 2215 Dime Savings Bank Bldg., Detroit

Foreign Representative: BENJAMIN WHITTAKER, 21 State St., New York

SPICER MFG. CO. - - PLAINFIELD, N. J.

The

Commercial Car Journal

is the logical paper for every man to read who contemplates buying or selling commercial motor cars.

It is brimful of essential information.

The Commercial Car Owner will also find many suggestions in it that will make his driving more efficient.

Send for a sample copy

Commercial Car Journal

Market & 49th Sts., Philadelphia, Pa.

Motor Truck Bands

MADE WITHIN THE FOLLOWING

Dimensional Tolerances

(ADOPTED BY THE SOCIETY OF AUTOMOBILE ENG.)

1.—Tolerance in circumference of felloe band:

	Plus	Minus
Before application to wheel - -	1-32"	1-32"
After " " " - -	1-16"	1-32"

Variation from precise measurement shall be uniform over entire width of band.

2.—Tolerance in width of felloe band:

	Plus	Minus
Up to and including 4" - - -	1-32"	1-32"
4—1-16" to 6" - - - - - -	3-64"	3-64"
6—1-16" to 12" - - - - - -	1-16"	1-16"

3.—Variation in trueness of band when placed on surface plate: Band shall touch at all points within 1-32" up to and including 6" width. Over 6" width within 1-16".

4.—Variation in thickness of band: .006" plus or minus.

5.—Trueness to round. The radial tolerance on the wheel when felloe band is applied shall be 1-16" plus or minus. This plus or minus tolerance must not occur at diametrically opposite points. There shall be no flat spots or kinks in felloe band on the finished wheel.

The Standard Welding Company
CLEVELAND
NEW YORK CHICAGO DETROIT

USE KEROSENE

CUT YOUR FUEL EXPENSE IN HALF

WITH THE

G. C. VAPORIZER

It **runs any motor on kerosene** and the cheaper fuels **better** than on gasoline, and operates **without carbon, odor** or **smoke.**

Every truck owner and user should learn all about this extraordinary motor improvement by sending for our booklet,

"Use Kerosene as Fuel"

G. C. Vaporizer Company of America, Inc.
1790 BROADWAY NEW YORK

B. A. Gramm's Motor Trucks

Newest Designs, Latest Improvements; Built in every detail to insure satisfactory and permanent results.

Write for photographs, descriptive literature and the exceptional values we offer you—far beyond all others.

The Gramm-Bernstein Co.
Exclusive Motor Truck Builders
Lima, Ohio, U. S. A.

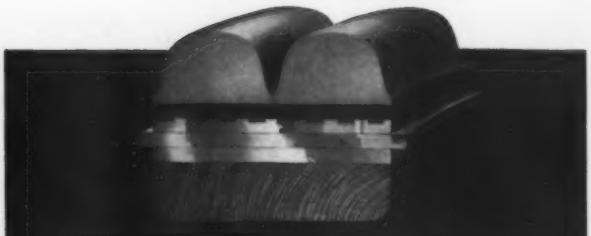
Swinehart
Cellular Truck Tires

Most resilient solid tire made. Absolutely non-skid. Increases traction and eliminates undesirable slipping and friction. Does away with the use of chains. The holes in the tire act as a radiator, preventing excessive heating and internal friction. The extra large surface of the Swinehart tread reduces the pressure per square inch to a point well within the safe and economical limit.

The wonderful elasticity, due to the combined use of our cellular design and the highest grade of rubber, allowing the tire to "give and take," to stand the road shocks without damage, is the true secret of Swinehart longevity. Demountable Quick Attachable.

We also make a full line of smooth tread and block tires, single and dual.

THE SWINEHART TIRE & RUBBER CO.
AKRON, OHIO
Boston Branch, 727 Boylston Street



3 BIG FACTS YOU SHOULD KNOW

about the Republic Steel Base Motor Truck Tire: 1, that this tire holds securely to the rim and cannot creep, because it is keyed on under high pressure; 2, that you can run it clear down to the hard rubber counterbase without causing chunks of the rubber tread to tear out; 3, that only external road-wear can affect it.

These three features make this motor truck tire more economical and efficient than any other style of tire. Let us give you the full facts and figure on your requirements.

THE REPUBLIC RUBBER CO., YOUNGSTOWN OHIO

BRANCHES AND AGENCIES IN THE PRINCIPAL CITIES

REPUBLIC
STEEL BASE
MOTOR TRUCK TIRE

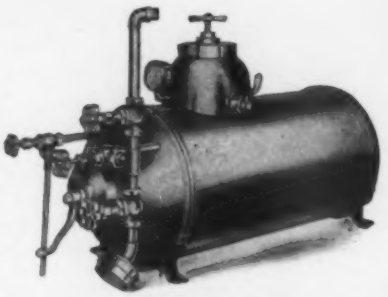
3-Gallon Approved Extinguisher

Chemical Fire Apparatus

HAND EXTINGUISHERS and TANKS

of every description for department apparatus. We are equipped to make tanks of any size or type.

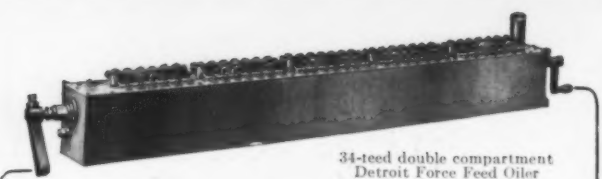
We also provide a complete line of Chemical Engines, mounted on wheels for service in factories, towns, villages, etc. Hose Reels, Hose Axles, Ladders, Hooks, etc.



35-Gallon Copper Tank

We can equip any chassis complete with body, chemical apparatus, etc. ***Ask us.***

O. J. CHILDS CO.
48 Liberty Street
UTICA, N. Y.



34-teed double compartment Detroit Force Feed Oiler

Largest Oiler ever built

This oiler provides for the lubrication of every part of the power plant. A separate feed goes to each part requiring lubrication and each feed can be regulated to supply **exactly** the right amount of oil at every varying speed without further attention.

A partition divides the tank into two compartments—one for gas engine oil and one for a heavier, cheaper oil for the bearings, gears, etc.

Detroit Oilers are made for **every** kind of engine—commercial truck, automobile, gas tractor, marine and stationary — with pulley, ratchet, gear or sprocket drive for **easy** installation on any outfit.

Detroit Oilers are insurance against lubrication troubles.

Specify a Detroit Oiler on your next truck or put one on your present outfit.

Write today for Catalog P-67 and full information, stating in what kind of engine you are interested.

DETROIT LUBRICATOR COMPANY.
DETROIT, U. S. A.
Largest manufacturers of lubricating devices in the world.

SAGER Shock Absorbers

Absolute Necessity for Commercial Cars

SUCCEED WHERE OTHERS FAIL

Endorsed by:

SAURER
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Try a set at our expense

We also make bumpers to protect radiator and other vital parts at front of truck.

J. H. SAGER COMPANY
293 South Ave. - - Rochester, N. Y.

Ford
THE UNIVERSAL CAR

NEW 1914 PRICES

Effective August 1, 1913

Model T Runabout . . $500
Model T Touring Car . 550
Model T Town Car . . 750

With Full Equipment, f. o. b. Detroit

Ford Motor Company
Detroit, Michigan

Made $4750 in Six Months With His Avery Truck

The Avery is the best truck for the overland hauling of Passengers and Freight, because of its reliability and durability.

Mr. Frank Bay, of Chisholm, Minn., has used an Avery truck for this purpose for some time, and in six months' service the truck only missed 5 days, 1½ days due to small repairs and the rest due to the great depth of the snow. Twenty-four dollars a day was the average daily receipts from the time he got the truck. His total receipts were over $4750. Because of this splendid showing he calls it

"The Truck that Does the Most Work."

The Avery truck is used in over one hundred lines of trade, and in every one it has made good; it has done its work well and satisfied its owner. When you buy an Avery truck you not only get a good truck but also genuine service is assured through our many branch houses and service stations. If you haven't seen the latest Avery truck catalog describing the many recent improvements in design and construction and the new models, write for one at once. Address:

THE AVERY COMPANY, 950 Iowa St., Peoria, Ill.

Steel Tanks

Air-Starter Tanks
Gasolene Feed Tanks

Our extensive manufacturing facilities enable us to meet your every requirement.

111 years old. Founded 1802

Wm. B. Scaife & Sons Co.
Pittsburgh, Pa.
New York Office
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Send also for catalog of
GASOLENE STORAGE OUTFITS

This is the
"Jasco Tank"

¶ It is made absolutely seamless and leakless, of drawn steel, thoroughly tinned and tested. It is

THE SAFETY GASOLENE RECEPTACLE FOR THE AUTO

¶ It not only insures the safety of the car and its occupants, but stops the constant drain on pocketbooks caused by waste of gasolene. Made in all standard styles and sizes.

JANNEY, STEINMETZ & COMPANY
MAIN OFFICE: PHILADELPHIA, PA.
NEW YORK OFFICE: HUDSON TERMINAL BLDG.

WHERE GOULD BATTERIES MAKE LOW TRANSPORTATION COSTS ON LARGE TONNAGES

THAT electric trucks driven by Gould Storage Batteries handle quantities of raw, unfinished, bulk or packaged material with splendid economy, is evidenced by continued use in the service of such prominent corporations as the following:

Arlington Textile Mills, Lawrence, Mass.
The Larkin Co., Soaps, Buffalo
The Larkin Co., Soaps, Philadelphia
The Durham Co., Tobacco, Durham, N. C.
Onsita Knitting Mills, Utica, N. Y.
Boettger Silk Finishing Co., New York
Gorham Co., Silversmiths, New York
Christian Science Publishing Co., Boston
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Gage Hat Works, Chicago

The Third Avenue R.R. Co. has been operating New York City street cars with Gould Storage Batteries for years and with the utmost satisfaction.

Gould Storage-Battery-driven trucks would make your deliveries with the same precision and with splendid economy.

It would pay you to give this matter serious consideration.

Gould battery renewal plates fit jars of any make.

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Gould Storage Battery Co.

General Offices: 30 E. 42nd St., New York
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Agents in all large cities
Full stock carried in all cities where we have offices or agents

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MONDEX-HELIX

USED IN CONJUNCTION WITH ANY CARBURETOR WILL

Reduce Gasoline Bills 25% to 40%

It thoroughly mixes the gasoline so that its full power-producing qualities can be utilized, giving increased power, particularly at low speed and on heavily loaded vehicles.

Price, $5.00

Mondex Shock Preventer

A device that absolutely controls the action of the springs by graduated compression of rubber. Heavy shock meets with much resistance, light shock with light resistance.

Made for light and heavy cars

Mondex Polish for automobile bodies and all varnished surfaces. Dries instantly, leaving a brilliant lustre. Free sample on request. Agents wanted everywhere.

THE ARISTOS CO.

250 W. 54th Street - - - New York

RELIANCE AUTOMOBILE CO., San Francisco, Cal.
Agents for Pacific Coast

Special FORGING Steel

BY

CROSS ROLLED (patented) PROCESS

PATENTED

WHY not secure your requirements from a company which makes a specialty of this kind of steel—a concern which has a large research and technical department to ascertain exact facts—for your benefit?

Forging Steel should be more than merely suitable for forging purposes, it should be especially made—rolled and treated in order to be "better."

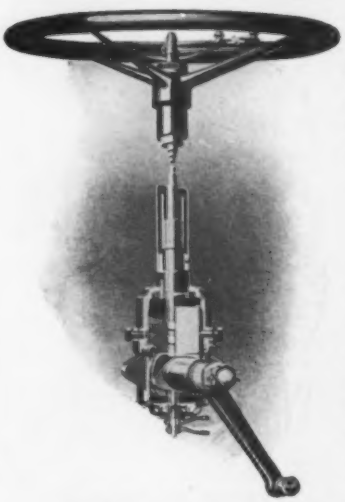
A forging is no better than the material from which it is made.

Write today for "Facts"

THE NEW YORK UNITED STEEL CO. CANTON, O. DETROIT CHICAGO

1909 **1913**

Pioneer Truck Steering Gear Mfrs.



We make more steering gears for commercial vehicles than any other manufacturer.

WHY?

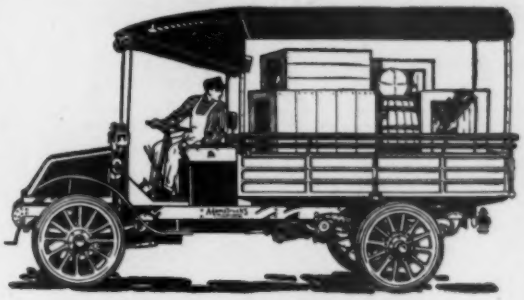
Because the truck manufacturers recognize that the Lavigne all-steel gear is of superior design and the ultimate user **knows** it.

Standard For:—Commercial Cars, Trucks, Tractors, and High-Grade Pleasure Cars.

Write for Blue Prints

THE LAVIGNE GEAR CO.

STATION A **RACINE, WIS.**



Adams Trucks

The Product of a Plant Devoted Solely to Commercial Vehicles

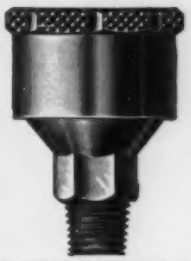
There is not a single vital feature of Adams construction that is borrowed from pleasure car building methods. Every part has been designed, tested and finally approved on a merciless basis which demands maximum value for the purpose required.

Adams Trucks are built to render the most exacting service—day in and day out—under all road and weather conditions.

That is why Adams Trucks are unequaled in those sizes in which we specialize, and why no other truck can show a lower record of maintenance and repair costs.

THE ADAMS BROTHERS COMPANY
438 West Main Cross, Findlay, Ohio

Built in 1, 1½ and 2 ton models. First American Truck Manufacturers to use the French type of hood. (Radiator at rear of motor.)



PLAIN COMPRESSION
(Patented)

Empress

BRASS AND STEEL
GREASE AND OIL CUPS

WE MANUFACTURE
a full line of Plain, Leather Packed, Ratchet, Marine, Spring Compression, and many other styles of Grease Cups.

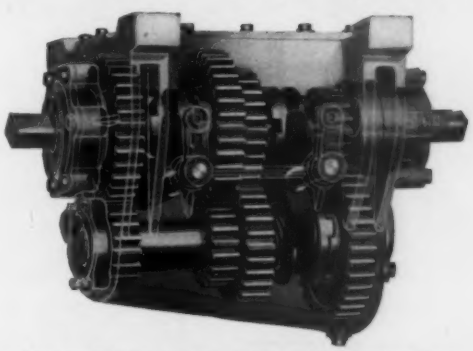
Our line of Oil Cups is equally satisfactory and complete.

Catalogue on Application

FUNNEL
(Patented)

Bowen Manufacturing Co.
AUBURN, N. Y.

COTTA TRANMISSSIONS



Internal View of Shaft-Drive Transmission, designed for use in worm-drive trucks

For Heavy Truck and Tractor Service
Eliminate Transmission Trouble

Selective type, individual clutch system. All gears always in mesh. Countershaft and mainshaft gears idle on direct. Improved speed-changing device. No plain bearings —loose gears mounted on roller bearings.

Write for Bulletin

COTTA TRANSMISSION CO.
814 So. Main Street **Rockford, Illinois**

"Reliable Springs are More important on Commercial Cars than on Pleasure Cars."

THE PERFECTION SPRING CO.
Cleveland - - - - - Ohio

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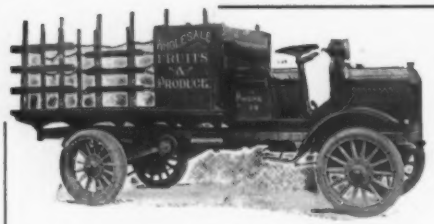
WE SPECIALIZE IN HIGH-GRADE

AUTOMOBILE PARTS

TRANSMISSIONS GEAR SHIFT LEVERS
STEERING GEARS DIFFERENTIALS
ELECTRIC STARTERS

THE WARNER MANUFACTURING CO.
TOLEDO, O.

TOLEDO



Model "B" 2-Ton
Chassis $2100

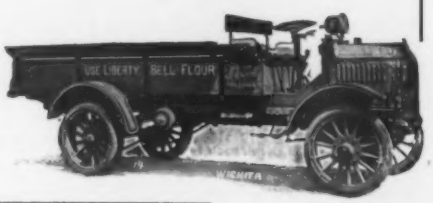
WICHITA TRUCKS

1 and 2 Ton Capacities

Dealers: Write or wire us for sales proposition, territory is being snapped up rapidly.

Wichita Falls Motor Company
WICHITA FALLS, TEXAS

Model "A" 1-Ton
Chassis $1650



FEDDERS

Real Square Tube Radiators

¶ Commercial cars require radiators that will stand many shocks and much hard usage. This was one of the weak parts of the commercial car but the test of time has proved that FEDDERS radiators render efficient service.

¶ We want to figure with you your requirements for the coming season. If you haven't used Fedders radiators you probably have had a great deal of radiator trouble and you may think that there isn't a radiator built that will give you satisfaction. If this is the case we would like to have an opportunity of demonstrating that the Fedders radiator will stand the wear and tear and shocks of the commercial car and that manufacturers who equip their commercial cars with the Fedders have practically no radiator trouble. We can convince you. Will you give us the opportunity?

FEDDERS MFG. CO., Inc.
BUFFALO :: NEW YORK

BUCKEYE Motor Truck Jacks

Buckeye Motor Truck Jacks are safe, reliable and made to stand the wear and tear for which they are intended. They are fully guaranteed, and cannot possibly drop with a load. They are made from Steel Drop Forgings, best finish and workmanship throughout.

Get our prices before you place your orders for jacks, we can save you money.

No.	Height Bar Down	Raise of Bar	Height Bar Up	Weight	Capacity		List Price
7	11¼"	6¾"	18"	16 lbs.	2½ tons	with formed handle	$10.00
13	14¼"	7⅛"	20⅜"	26⅛ "	3 "		15.00
14	14¾"	7⅞"	20⅞"	33 "	5 "		16.00
9	11⅛"	6"	17⅛"	10 "	1½ "		6.00

Write today for descriptive catalog. Made only by

THE BUCKEYE JACK MFG. CO., Alliance, Ohio

A. & R. Trucks Offer
A GOLD BOND INVESTMENT

and pay big dividends to the motor truck owner who demands an efficient, durable, as well as dependable trucking equipment, capable of producing the lowest haulage cost possible.

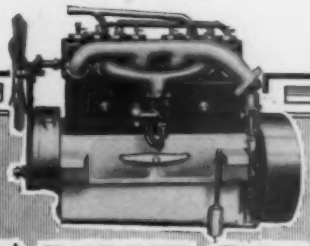
A. & R. owners, in widely varied lines of business, have found these trucks superior to any they have ever used. They are right in construction and right in price, a combination that meets with little competition. Re-orders prove their faith and the value of their investment, for re-orders alone offer true evidence of lasting satisfaction.

The same high manufacturing standard, established in 1867, by the Abendroth & Root Manufacturing Company, in the manufacture of products for the engineering field, has been carefully maintained in the building of A. & R. Trucks. It is our guarantee of superior truck construction.

There are many other convincing facts you should know. Send for A. & R. MotorTruck Booklet, prices, etc., today.

Dealers: We have a number of good sales territories still uncovered. Write for particulars.

ABENDROTH & ROOT MFG. CO.
SINCE 1867
46 CHURCH ST., NEW YORK CITY
Works: Newburgh, N. Y.



WAUKESHA
4¼×6¾ LONG STROKE TRUCK MOTOR

EFFICIENCY is the Waukesha Motor's best eulogy. It is efficient because it is constructed to give the utmost in service.

The Waukesha crankshaft has a tensile strength of 70 tons. The bearings have three times the wearing quality of ordinary bearings. Both these metals are our own processes. The rest of the motor is on par with these two features. When we can prove all this, why not ask us to?

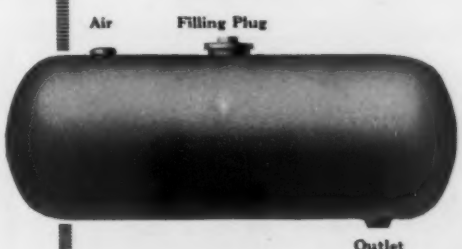
Why not learn that you can put a motor in your trucks that will *exceed* your broadest guarantee of efficiency, wear and economy of fuel? Your request will bring proof that will leave no doubt of the Waukesha Long-Stroke Motor's supremacy.

WAUKESHA MOTOR CO.
WAUKESHA Dept. A. WISCONSIN

AN EXCEPTIONAL MOTOR

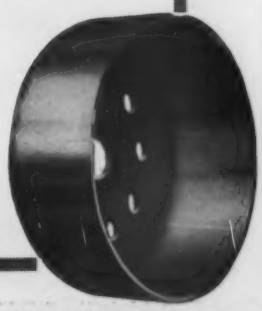
Seamless Steel Products

Brake Drums
Pressed Steel Tanks



Heavy Flanges, etc.

Any Diameter, Gauge or Height



Federal Pressed Steel Co.
Milwaukee : Wisconsin

Booklet Free

It tells the owner how to keep his car in the best of condition and what to specify when having the car done over.

It demonstrates to the finisher why permanent results pay best and why no jobs need "go wrong."

It contains a number of popular color samples and a novel plan for showing how they will look when put on a car.

Write for it today

VALENTINE & COMPANY
456 Fourth Avenue :: New York City

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REMY

World's largest Manufacturers of Ignition

THE best authorities agree that your truck investment will not be profitable unless the service is continuous. The one and only way to guarantee continuous service is to guarantee 100% efficient ignition with the famous Remy Magneto.

Remy Electric Company

Anderson, Indiana

Service Stations Throughout the Country

Certainly! We Build Palmer-Moore Trucks With Any Desired Type of Body

THIS special tank wagon, built for the delivery of oils and gasoline, is a good example. The tank is divided into two compartments, holding 140 gallons each, and with its pillow blocks is removably mounted upon a standard flat deck. Therefore, for the delivery of cans or barrels, the truck may be used with the flat deck and stakes slipped into sockets provided for that purpose.

The flexible control, simplicity and dependability of our two-cycle air-cooled variable-port engine, the protected transmission, the equalized brakes, the saving due to the use of solid tires, the solid construction throughout — all are features that make the Palmer-Moore the best truck on the market for light and medium delivery service.

It will pay you to get detailed explanations of these advantages. Tell us what you need a truck for, and we will advise to your best interests.

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SYRACUSE, N. Y.

Budd ALL STEEL Bodies

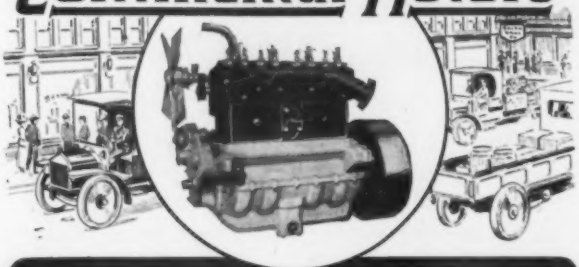
represent the last word in the art of truck body building. They stand for strength, stability, sturdiness and efficiency. Made entirely of steel, they will not rot or crack. They cannot warp or split. They will stand the maximum use or abuse and are practically indestructible. They eliminate fire risk. They are light in weight and easy on tires—pleasing in design and attractive. Summed up in a word, they give the highest degree of Service.

They are made in many styles—of any desired capacity. Estimates promptly furnished. Write us today for full information.

Edward G. Budd Manufacturing Co.

Ontario and I Streets, Philadelphia, Pa.
Detroit Office and Showroom, 796 Woodward Ave.

Continental Motors



A Mighty Power in the Motor Truck Field

75,000 Continental Motors develop 3,000,000 H. P. daily

This tremendous cataract of Continental power is doing a large share of the world's work. In the market place, over crowded city thoroughfares, upon the highways and byways of the open country, in the freight yards — everywhere — it propels great loads of merchandise with sureness and dispatch.

And more. This famous motor is selling the trucks that bear it, is bringing profit to user, dealer and maker, and is building up many commercial car reputations of merit.

Tap this tremendous force of power for your trucks — use Continental energy.

Continental Motor Mfg. Co., Detroit, Mich.

Factories at Detroit and Muskegon, Michigan

TRUCK BRAKES SHOULD RESPOND AT ONCE!

They should grip and hold and stop the car. They will—always—if they are lined with

TRADE MARK **Raybestos** REG. U.S. PAT. OFF.

"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING"

When you equip your brakes with the Standard Brake Lining of the Industry you insure your truck against accident. ***Raybestos*** keeps the car under control.

It is made of genuine long-fibre asbestos, specially woven and treated, and is practically indestructible.

Demand ***Raybestos*** and make sure you get it. The name is stamped on every foot for your protection.

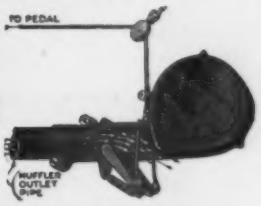
The Royal Equipment Company

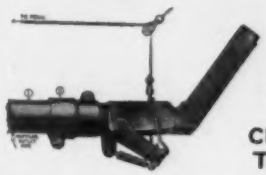
Railroad and Bostwick Avenues
Bridgeport, Conn.

We make Raymond and Duplex Brakes and Gyrex, the Mixer

Incomparable for Commercial Motor Vehicles

Jericho Horn ONE TONE





Jubilee Horn CHIME TONE

Prices, $7, $8, $9, $10, According to size

The Horns that are always ready and effective; that never clog or get out of order; that eliminate all maintenance expense; that are pedal-operated, leaving the driver's hands free; that are guaranteed for the life of your car.

THE RANDALL-FAICHNEY CO.

Jamaica Plain, Boston, Mass.

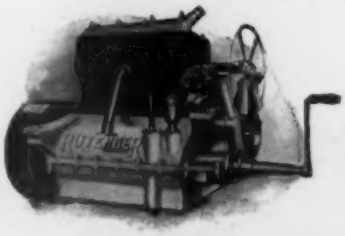
Also makers of B-Line Guns, MacKae-Blitz Spark Plugs, Jericho Gas Regulators, and other automobile accessories

THE RUTENBER MOTOR

Manufactured since 1901 for high-grade

Automobiles and Trucks

3¼ x 5¼ four and six cylinder
4¼ x 5¼ four and six cylinder
Standard or Unit
and
4 x 4, 4½ x 5 and 4¾ x 5 Standard Types
All L-Head, 4-Cycle



Manufacturers are invited to investigate our service and our facilities. Literature on request.

The Rutenber Motor Company

MARION, INDIANA

SPLITDORF

"Always There"

Neglect breeds mischief—

and every day you neglect insisting upon the use of SPLITDORF COMMON-SENSE PLUGS you are opening the way for mischief in your ignition system and your motor.

We make no mistake in claiming absolute superiority for SPLITDORF PLUGS, for they are soot-proof, gas-proof and unbreakable, and we GUARANTEE OUR CLAIMS.

Neglect no longer—insist upon SPLITDORF PLUGS with the hexagonal porcelains, and eliminate all chance of future mischief.

Remember, all! "New ignition for old" is our slogan—we have a SPECIAL EXCHANGE proposition of the greatest interest to every owner of a gasoline motor who would save time and money. Write or call TO-DAY for particulars.

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BOSTON, 180-182 Massachusetts Ave.
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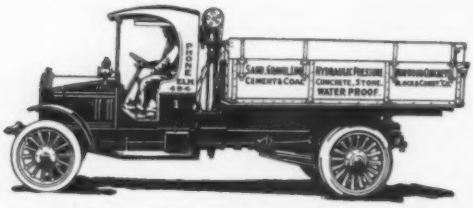
DETROIT, 972 Woodward Ave.
KANSAS CITY, 1823 Grand Ave.
LOS ANGELES, 1226 S. Olive St.
NEWARK, 200 Halsey St.
NEW YORK, 18-20 W. 63d St.
PHILADELPHIA, 210-212 N. 13th St.
SAN FRANCISCO, 1028 Geary St.
SEATTLE, 1628 Broadway
LONDON BUENOS AIRES

Factory: Newark, N. J.



THE EFFICIENCY IDEA

has been creeping steadily into every business. But with the new tariff the idea must become a fact. You must save every possible cent in making, selling and delivering.

We offer you the means of greatest saving that motor truck delivery can make. This means is the

PIERCE-ARROW
5-Ton Motor Truck

the motor truck with the worm-gear drive, the proper distribution of weight, the flexible frame—the motor truck of short turn, quick getaway, endurance and unusual operating economy.

It will pay you to learn all about the Pierce-Arrow.

The Pierce-Arrow Motor Car Co.
BUFFALO, NEW YORK

MODERN
THE BOWLING GREEN MOTOR CAR COMPANY

Built to Keep on the Road and Out of the Repair Shop

"Modern" 'Bus and Livery Service Vehicles combine the highest degree of reliability with the lowest operating and maintenance costs.

Timken Axles and Bearings, Brown-Lipe Transmission and 4⅛ x 5¼ Continental Motor in our 1½-ton *"Modern"* indicate the standard that has given these trucks a reputation second to none.

We build bodies for all trades and to suit any special conditions

PRICES — Chassis only, of the usual types of trucks, with seat, ¾ ton, $1,350; 1 ton, $1,600; 1½ ton, $1,800.

The Bowling Green Motor Car Company
Department "D" **Bowling Green, Ohio**

"BEST"

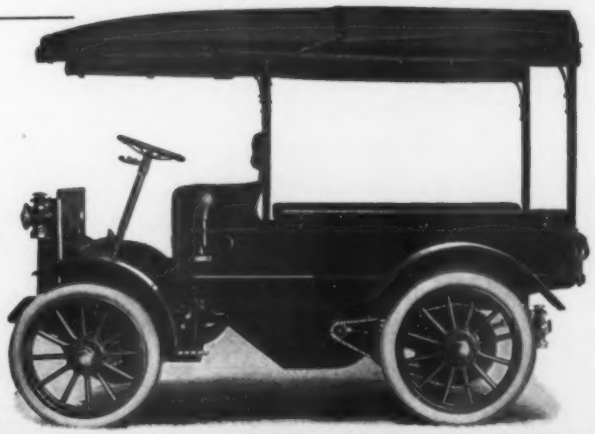
1000 to 1250 lbs. Capacity

42" x 72" Loading Space

Price, with Top, Pneumatic Tires } $890.00

FLINT MOTOR WAGON DEPT.

DURANT-DORT CARRIAGE CO.
FLINT, MICH.



BOLLEE LAUTH-JUERGENS RANDOLPH SEAGRAVE KISSEL GRAND RAPIDS SCHNEIDER KINNEAR PEERLESS RENAULT

ADLER WERKE

BALL BEARINGS

HISPANO-SUIZA

"INSURANCE FOR BUILDER AND USER"
RHINELAND MACHINE WORKS CO
140 WEST 42nd ST. NEW YORK, N.Y.

GEBRUDER STOEWER ARIES KELLY NAGANT PANHARD PEUGEOT DELAHAYE MACK DE DIETRICH AUTO-METALLURGIQUE

Here's a High Grade Motor Truck Easy to Buy, Easy to Operate and Easy to Pay For

You couldn't ask for more than we offer you in the

Selden One-Ton Truck

every feature of which compares favorably with trucks selling for double the money.

The price is $2000 but so confident are we of the absolute dependability of this truck that we let you put it into service upon payment of only $500 down and the balance in twelve monthly installments of $125 each. This practically allows the Selden to earn its cost during the time you have to pay for it.

THE SELDEN TIME PAYMENT PLAN

has proved popular with hundreds of firms that did not feel that they could spare the full purchase price from their working capital at one time, and should appeal to you.

Investigation will prove the Selden is the Truck you want and on terms that you can afford.

Agents wanted in unassigned territory

Selden Truck Sales Company

213 East Avenue *Pioneers in Selling Trucks on Time* Rochester, N. Y.

CULLMAN SPROCKETS and Differentials

in stock and to order.

Send for catalog and let us quote you on your requirements.

CULLMAN WHEEL COMPANY, CHICAGO

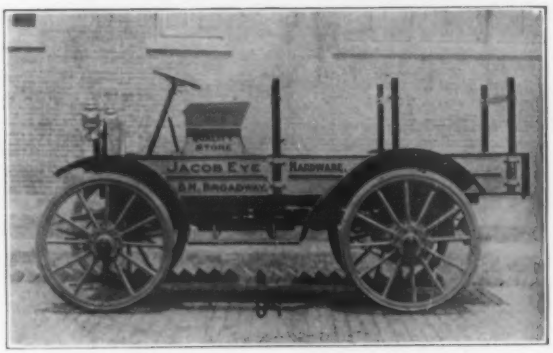
1351 GREENWOOD TERRACE

$800.00 MERCURY TRUCKS $800.00

SPECIAL HARDWARE TRUCK

1000 POUNDS CAPACITY

BUILT SPECIALLY FOR HARDWARE DEALERS



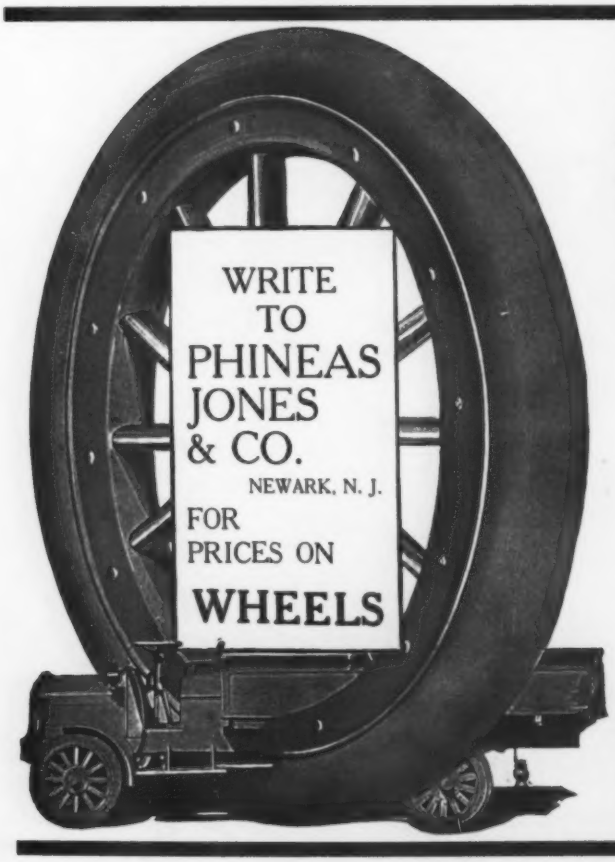
EQUIPPED PER PHOTO: FENDERS, LAMPS, HORN, STAKES, WITH CLEAR 10 FEET INSIDE.

THIS CAR $800.00, OTHER MODELS $750.00 TO $900.00

AGENTS—WE WANT YOU TO GROW UP WITH THE MERCURY

WRITE AND GET OUR PROPOSITION

THE MERCURY MANUFACTURING COMPANY, 4106 S. HALSTED ST., CHICAGO, ILL.



AUTOMOBILE WHEELS for PLEASURE CARS and TRUCKS

Repairing and truing old wheels a specialty

Experimental wheels a specialty

We furnish and apply any style demountable or detachable rim or tire

BEST ON EARTH—KANTSAMORE

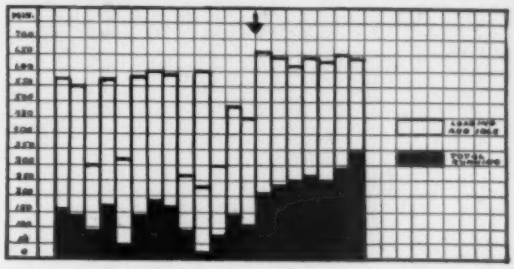
ESTABLISHED 1858

PHINEAS JONES & COMPANY

305-313 Market Street :: Newark, N. J.

Branch Factory: 12th Avenue and 55th Street, New York City

Stopping a Delivery Leak



This Chart Convinced a Firm That Its Delivery Department Could Be Improved

Each of these columns represents the total time in service each day. The first thirteen days show irregular hours of service and a very low percentage of running time.

On the fourteenth day the shipping department was shown how much time was being lost. The improvement speaks for itself. Note the regular time in service and the big increase in tonnage as shown by running time.

When a man finds that his motor delivery is too expensive—"too much trouble,"—one thing is surely the cause; his trucks are wasting time.

The Servis Recorder shows what your trucks are doing every minute of the day. It shows how many trucks you REALLY need to do your work.

Remember this astonishing fact—THE AVERAGE MOTOR TRUCK WORKS LESS THAN ONE-THIRD OF THE TIME—even under the most favorable conditions, carefully supervised by the usual methods of checking.

To the man who is satisfied that his system of handling deliveries is "perfect," **The Servis Recorder** will show, as it has in hundreds of cases, unexpected and costly losses in efficiency.

To the man who knows that there is something wrong with his delivery and cannot put his finger on the leaks, **The Servis Recorder** will give the accurate facts he is seeking.

This is not merely theory. It has been proven in the case of hundreds of concerns, in more than fifty lines of business, in forty-three cities. The actual figures are at the disposal of the man who wishes to make his delivery a source of satisfaction and pride, instead of a vexing problem.

No matter what your delivery conditions are, you should at least investigate what the **Servis Recorder** will do. It will not put you under any obligation. Write today for literature.

The Service Recorder Co.

2428 E. 105th Street **Cleveland, Ohio**

HIGH SPEED NON-GRAN BEARING BRONZE

NON-GRAN Bearings In Motor Truck Work

This is Why they stand up and keep the truck on the road:—

With the aid of a microscope, you will see that the polished surface of a bearing, instead of being one solid piece, as it appears to the naked eye, is, in reality, composed of billions of minute particles. Now these particles are constantly being pulled at by the friction of the shaft revolving against them,—just as your hand would be pulled, were you to hold it around a rapidly revolving shaft.

The reason a bearing wears out is because these particles cannot resist this pull and are torn away from the billions of particles immediately back of them. As this tearing away of particles goes on, the inside diameter of the bearing keeps getting larger and larger until it no longer holds the shaft snug.

Whether or not a bearing will show rapid wear, depends upon the **structure** of the bronze and how well the constituent particles can **resist** frictional pull.

The structure of NON-GRAN Bronze is the direct opposite of the granular structure of other bronzes in which the particles have no holding bond between one another.

The structure of NON-GRAN is non-granular, it is fibrous. The particles in its construction are all knit together in a solid mass so that friction on the bearing surface cannot pull the particles from their tightly interlocked positions.

The particles of a NON-GRAN Bearing are thus absolutely secure against all normal frictional pull, and give way **only** to the very occasional abnormal pulls such as would be caused by tremendous continued shaft pressures or the almost complete absence of lubricant.

It is clear, therefore, that the reason NON-GRAN Bearings stand up for from three to five times longer than bearings of any other bronze is because NON-GRAN gives way **only** to **abnormal** friction.

The choice of the world's best car manufacturers should convince you.

SIMPLEX STERLING-DURYEA MARMON GARFORD SAURER MACK

Do you often see cars such as these in the repair shop?

Little wonder that cars of this calibre are so eagerly sought by experienced purchasers

AMERICAN BRONZE COMPANY

Sole manufacturers of NON-GRAN and largest exclusive manufacturers of bearing bronze in the world.

1435-1469 Chester Blvd., Berwyn, Pennsylvania

HIGH SPEED NON-GRAN BEARING BRONZE

The Safest Car On Traffic-Crowded Streets Is The Krebs—"The Car That Thinks"

As the **Krebs** is the only car having a **variable** governor, its special advantage for Motor 'Bus Service is evident. The driver is relieved of all thought of his motor. It cannot race, lag or stall, but evenly maintains the speed required.

The driver has nothing to do but steer. The governor expertly and economically controls the motor through its fuel supply, obviating waste and mishandling.

The Krebs is made in ¾-ton, 1-ton and 1½-ton models, with bodies to suit all industries. Write today for full information, and ask about open territory.

THE KREBS COMMERCIAL CAR CO., Clyde, Ohio

S. R. B.
Annular Ball Bearings

Maximum Type

One of the leading automobile manufacturers of this country recently ran a test on Annular Ball Bearings, taking the results of the test of a prominent foreign bearing as indicating 100% efficiency. On subjecting the S. R. B. Annular Ball Bearing to the same test, they found they obtained an efficiency of over 700% as compared to the foreign bearing's 100%.

The maximum number of balls used in S. R. B. Annular Ball Bearings allows them to sustain a maximum end thrust. It also practically doubles the life of the bearing, as compared to a bearing with a smaller number of balls. S. R. B. Annular Ball Bearings have been operated 88,500,000 revolutions at rated loads and without failure. This is equivalent to 150,000 miles with a 36″ wheel.

For prices and further data write

STANDARD ROLLER BEARING CO.
PHILADELPHIA, PA.

Are You Getting Full Power From Your Engine?

If you are not, the trouble probably is due to leaky piston rings—a common cause of loss of power.

To lose power from any cause is a serious thing, for it materially increases the cost of operation. When that loss is avoidable and is allowed to continue it is very expensive neglect, both in its immediate and ultimate results.

Once leaky piston rings were unavoidable, but now no engine need lose power from that cause, for if your pistons are encircled with

Piston Rings

escape of gas from the explosion chamber is impossible, giving you a full charge and perfect compression, hence the maximum of power.

Leak-Proofs also prevent oil working up into the combustion chamber, thus reducing carbonization.

Leak-Proofs are simple two-piece concentric rings, made of special gray iron, constructed so the point of expansion in each piece is opposite that of the other, giving equal pressure, and each half carrying a flange covering the opening in the other half.

For convincing proof of what they are doing for thousands of motorists,

"Ask the User"

McQuay-Norris Mfg. Co.
1309 Chestnut Street, St. Louis, Mo.
DEPARTMENT C

NEW YORK—Suite 53, Lincoln Square Ct., 64th & Broadway
CHICAGO—Suite 39, Merchants Bldg., 106 N. La Salle St.
PITTSBURGH—7620 Tioga St.
KANSAS CITY—1504 Grand Ave.
FORT WORTH—108 Bryan Ave.
LOS ANGELES—224 Central Bldg., Sixth and Main Sts.
SAN FRANCISCO—164 Hansford Bldg., 268 Market St.

FRAMES

For Pleasure Cars
Commercial Cars
Trucks

Any size
Any design
1/2 ton to
10 ton

The men out in the plant

Every superintendent and every foreman in your part-builder's plant exerts through the quality of *his* product a vital influence on the success of *your* product. The men in the plant of the

HYDRAULIC PRESSED STEEL COMPANY

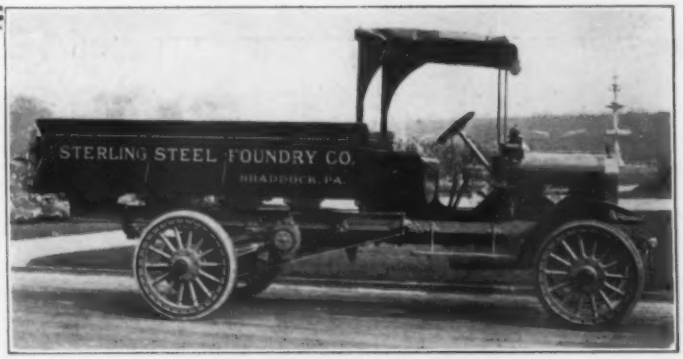
are the type of men who can make success easier for you. Long training in economical handling of modern presses plus a proper pride in their efforts, combine to produce frames of quality, at a cost that means a right price when delivered to you.

The Hydraulic Pressed Steel Co.

3152 East 61st St.
Cleveland, Ohio

The Less a Driver Has To Do, the More Likely He Is To Do It.

Reduce the number of wearing points on a truck, and provide easy lubricating facilities, and you have a vehicle that will cost less per mile of haul than one that requires more of the driver's attention. This is one of the many good features of



LANGE TRUCKS

Built and tested in a city acknowledged to be "the motor-truck test-ground of the world", they have earned the title of

"THE TRUCKS THAT LEVELED PITTSBURGH"

Their uniform reliability under service conditions that have sorely tried all other makes, should commend them to your thoughtful attention.

Why not send your engineer—or come yourself—to our factory—"the only automobile factory in Pittsburgh"—and let us give you a working demonstration?

LANGE MOTOR TRUCK COMPANY **PITTSBURGH, PA.**

$25 At Your Dealer's or Direct from Factory

SEND FOR CATALOGUE "D"

Veeder HUB ODOMETER

Have you any suspicions that your cars are being used more than the record shows? There are various ways of getting around most recorders and your records may be falsified.

There is a quick, sure and inexpensive way of knowing the **exact** distance each car has traveled—a record that cannot be altered or doctored.

Simply place **VEEDER HUB ODOMETERS** on your cars. They register backward as well as forward. They cannot be disconnected by slipping gears out of mesh. Mileage cannot be subtracted by running the wheels backward. You know to a certainty what each car is doing.

VEEDER HUB ODOMETERS take the place of the regular hub cap and are sealed to the hub. They cannot be taken off without the owner's knowledge. They are durable, accurate, simple in construction and operation and can be attached by any mechanic.

Get them for your cars—they will soon repay you. Send for Catalogue "D."

THE VEEDER MANUFACTURING COMPANY, Hartford, Conn.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings

Stop—

Here's Positive Means of Better Trucking Service. A Truck Tire That Saves Time!

That's because of the individual fastenings of the blocks. This feature offers unique and saving advantages that ought to appeal to every truck owner demanding maximum truck efficiency. A heavy-duty tire of unequalled traction, and practically non-skid.

Each block held by its own fastening

GOODYEAR
AKRON, OHIO

Individual Block Truck Tire

Instead of a single fastening holding in **several** blocks, **each block** has its **own** fastening in this Goodyear Tire.

Instead of your having to disturb several blocks when you want to remove, replace or adjust one block, you move the fastenings of this one block only.

Instead of several blocks working loose and wearing out because an in-between block won't permit plate to be screwed down tighter, **every** block can be kept tight. Thus working loose is prevented; the life of the tire is vastly increased; and time and labor are both saved.

To make adjustments, an ordinary wrench only is needed. Loosen a couple of bolts, pry up plate—out drops block. And it goes on just as easy. A tire that is durable—resilient. Rides as easy as a tire of continuous tread.

65% of All 1913 Motor Trucks

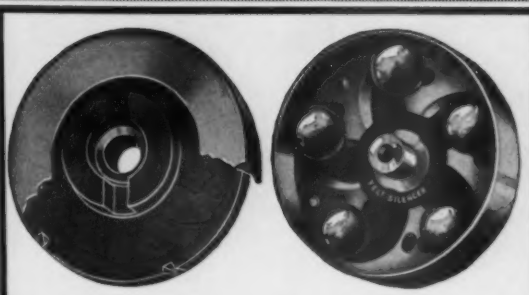
are being equipped with Goodyear Truck Tires, of which there are seven, including the one above described.

These seven tires cover every need of motor trucks—a tire for every purpose. Made by tire experts who know **truck requirements** better than the average truck owner. Each of these tires has proved its ability to increase the efficiency of truck on which fitted.

Tell us what kind of truck you have. Let us send booklet covering your requirements.

THE GOODYEAR TIRE & RUBBER COMPANY, AKRON, OHIO
Branches and Agencies in 103 Principal Cities

We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits. Main Canadian Office, Toronto, Ont. Canadian Factory, Bowmanville, Ont.



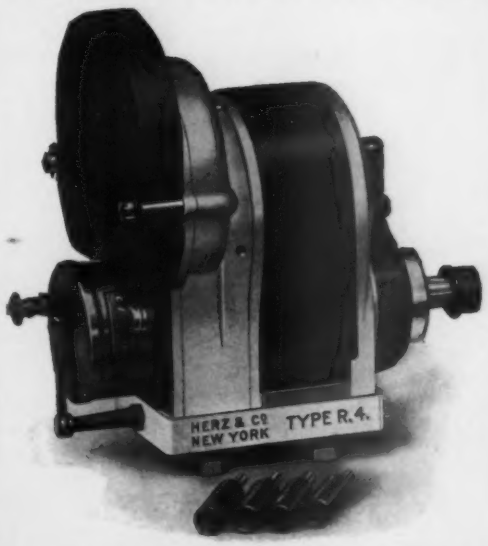
HERZ AUTOMATIC TIME ADJUSTMENT

This simple device marks a tremendous advance in ignition methods from the viewpoint of economy, efficiency and also convenience. In a single step, it has eliminated entirely all pounding and the possibility of back-kicks, reduced gear-changing to the minimum, effected a material saving in gas consumption and insured the maximum efficiency of the motor. It is absolutely noiseless, and *can be attached to any Magneto.*

The spark is advanced or retarded automatically in proportion to the speed of the motor. This insures the spark of greatest possible efficiency at all speeds.

That the HERZ MAGNETO is far superior to any other make, for use on Commercial Cars especially, is abundantly proved by recent tests which have established to a certainty the fact that this Magneto is the strongest of its size and weight in the world. In the official English Test against 15 competitors, HERZ MAGNETO gave a hot, efficient spark at 35 R.P.M. as against 45 R. P. M. for its nearest competitor.

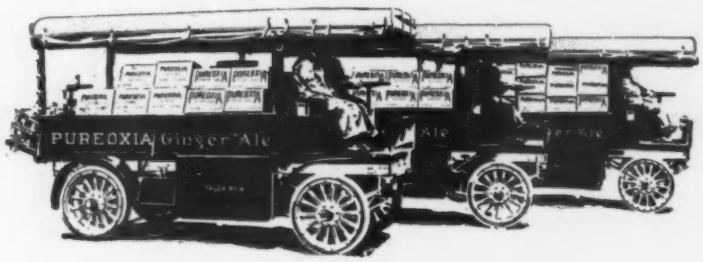
Use the **HERZ MAGNETO** with
HERZ AUTOMATIC TIME ADJUSTMENT



HERZ & CO., 295 Lafayette St., NEW YORK
Manufacturers of the HERZ PLUG ("Bougie Mercedes")

Reduced Delivery Costs and the G. V. Electric

The importance of the motor truck as a factor in the nation-wide movement to lower the cost of living looms up bigger every day. The positive incompetency of the horse to cope with the present-day demands for prompt deliveries, readily supports the above contention. All things being equal the next move then is to adopt such equipment as will not only fill the demand for greater efficiency, but also to perform that function at less than the cost to maintain horses.



No system of delivery ever solved that problem more quickly or economically than did the G. V. Electric. Incorporated in the construction of this simple yet enduring conveyer of merchandise is the experience of engineers who have spent years in accomplishing the one big desire to make the G. V. product absolutely unbeatable.

Today there are over 3000 G. V. Electrics in daily use, and we are willing that the performance records of every one of them be accepted as evidence of our ability to put the right truck in the right place.

The time for you to investigate is now. Write for Catalogue No. 84 and comparative operating costs.

General Vehicle Company, Inc.

General Office and Factory: Long Island City, N. Y.

NEW YORK CHICAGO BOSTON PHILADELPHIA

There is an apparent discrepancy at this point.

The pages are either missing or the pagination is incorrect.

The filming is recorded as the book is found in the collections.

THE TIRE OF THE HOUR

There is always a leader—someone or something that has an edge on all the others. In tiredom there is a make used on Commercial trucks that has a big edge on all its competitors. It is the tire of the hour; and to have the maximum satisfaction and service you must insist on getting

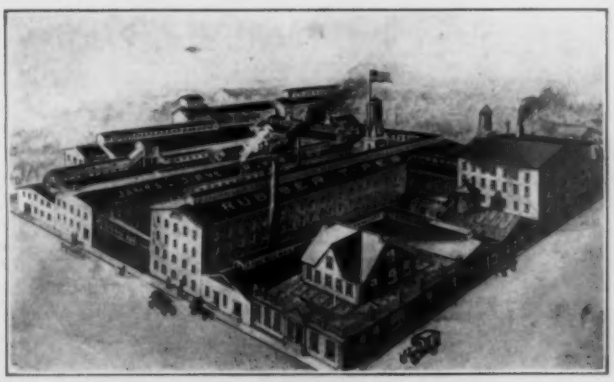
GIBNEY WIRELESS TIRES

Their leadership is no accident. It is the result of far-sighted thought, experiments and preparations which conceived, brought into being and proved the value of wireless tires long before others thought of them. It is a tire virtually without competition, for it was, is now and will continue to be

THREE YEARS AHEAD

DEALERS who like to lead and not trail will find in Gibney Wireless Tires a line which will lead and defy competition. We have territory open for the right kind of representation. Write us.

GIBNEY
Tire & Rubber Co.
Philadelphia Boston
New York Minneapolis
Baltimore



FACTORY: CONSHOHOCKEN, PA.

GASOLINE TRUCKS GMC ELECTRIC TRUCKS

GENERAL MOTORS COMPANY

BOTH *GMC* Gasoline and Electric chasses, equipped with 'bus bodies, are being successfully used by hotels, sight-seeing companies and resort associations.

GMC chasses are built in a wide range of sizes and in both gasoline and electric powers. For that reason, it is possible for us to meet most difficult and exacting motor-'bus requirements.

For certain classes of service, electric machines have unquestioned advantages, but for others the greater radius and power capacity of the gasoline vehicle is absolutely necessary.

From the comprehensive *GMC* line, you can select a machine that will serve you best from every standpoint.

Our co-operation in the solution of your motor-'bus problem is yours for the asking.

All GMC Trucks are backed by GENERAL MOTORS COMPANY, the largest manufacturers of motor-propelled vehicles in the world

GENERAL MOTORS TRUCK COMPANY

PONTIAC MICHIGAN

Makers of Gasoline and Electric Trucks of all Capacities

BRANCHES:—New York Boston Philadelphia Detroit Chicago Kansas City St. Louis

When Writing, Please Say—"Saw your Ad. in the C C J"

BOWSER SAFE OIL STORAGE SYSTEMS

The stamp of approval of Insurance Companies and Fire Prevention Bureaus has been placed on the Bowser Storage Systems, because they are built to conform to that measure of safety prescribed by the National Board of Fire Underwriters and are so labeled.

When to these two highly desirable considerations you add the long-established facts that the BOWSER SYSTEM prevents evaporation and gives you clean, full-strength, accurately measured gasolene, you have every "why and wherefore" needed to convince a practical, reasonable man, that the Bowser Storage System should be installed in his garage without further delay.

Above-ground storage of gasolene and oil is not only dangerous, causing a high rate of insurance, but it results in a loss of power, the addition of impurities, and a higher mileage upkeep.

When considerations of safety, economy and service all point the same way, it is high time to obey their injunctions and install a BOWSER SYSTEM. Many, many others using our outfit have substantiated these facts. **Prices, sizes, styles** to exactly meet your needs.

To learn how you can daily save money on a small investment send for our interesting booklet. It's free. Writing will not obligate you in the least.

S. F. BOWSER & CO., Inc.

Home Plant and General Offices, Box 2118 Fort Wayne, Ind., U. S. A.

Sales Offices in all Centers and Representatives Everywhere

Original patentees and manufacturers of standard self-measuring hand and power-driven pumps, large and small tanks, gasolene and oil-storage and distributing systems, self-registering pipe-line measures, oil-filtering and circulating systems, dry-cleaners' systems, etc.

ESTABLISHED 1885

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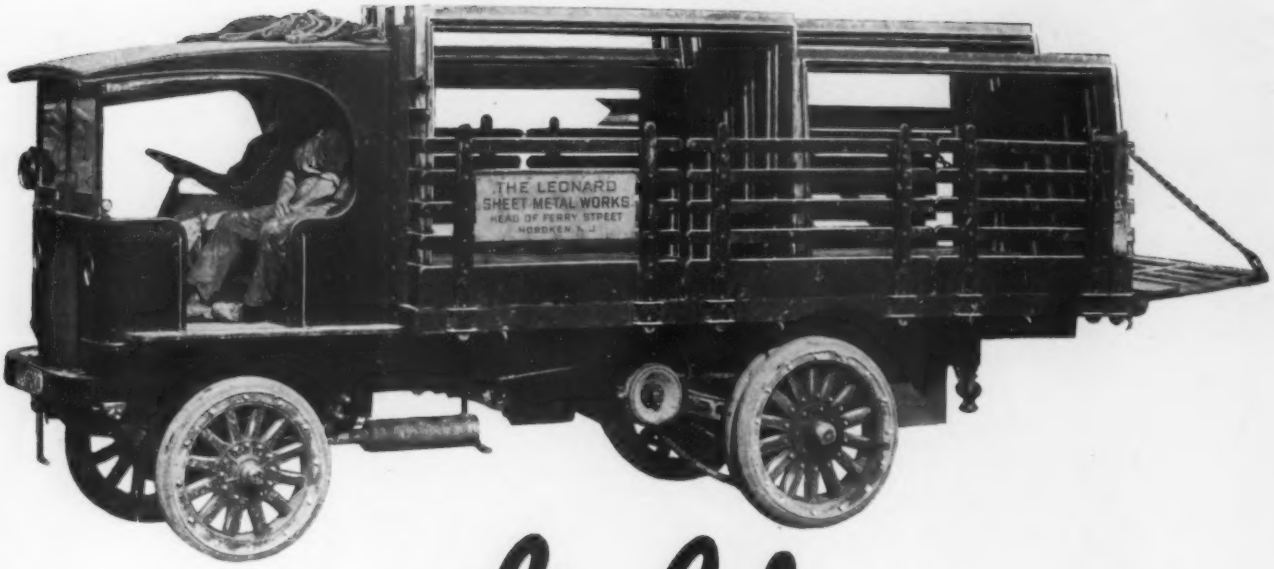


Garford

TRUCKS

Big Business Judgment Proves Garford Value

IN the past six months, 58 of the largest and most representative firms in their respective lines in and about New York City have purchased from one to eleven Garfords each.

Over 66 per cent of these sales were on *repeat* orders—the purchasers had heretofore owned and operated from one to sixty Garfords each.

In nearly every single case these repeat orders came from firms which had operated Garfords side by side with trucks of other makes. Their re-order means that every other truck tried was discarded and the Garford adopted as standard.

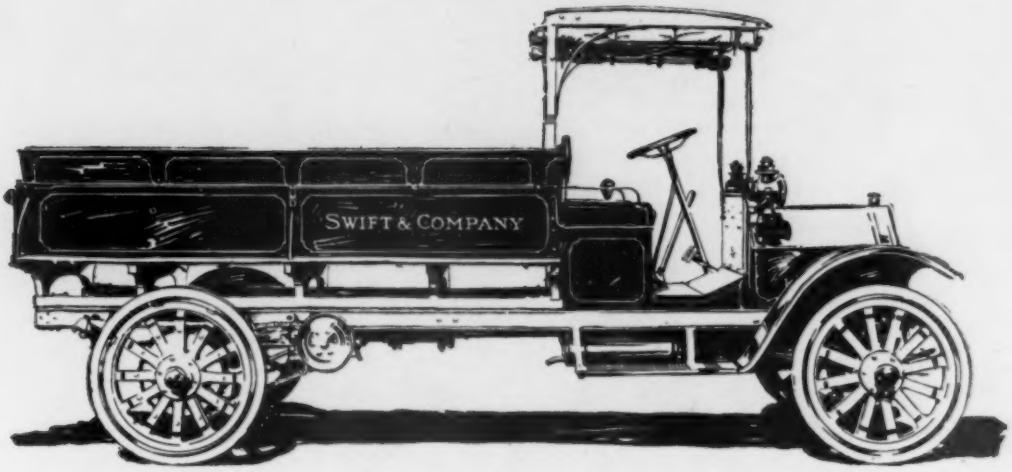
The firms represent a wide variety of business lines. There are contractors, brewers, meat dealers, grocers, dairymen, coal dealers, commission merchants, transportation companies, cemetery associations, candy manufacturers, oil companies, hat makers, municipal departments and leaders in a dozen other industries in the list.

What the Garford is doing for others—in more than 200 lines of business—it will do for you. There is a Garford for every requirement. We build them in every model and capacity from two to ten tons. We can furnish any kind of dumping, removable or stationary body, to suit your needs.

Tell us your transportation problems. We have data and figures on every line of business. Write today. Please address Dept. 11.

The Garford Company, Elyria, Ohio

FEDERAL



Send for your copy of "The Blue Book of Traffic"

Whether you are the owner of a motor truck—
Or have charge of the transporting of your firm's goods—

"The Blue Book of Traffic" will be helpful and profitable to you.

It illustrates the newest developments in the building of motor trucks; it suggests economies and conveniences.

The trucks of the pioneer of motor truck delivery are illustrated, showing the style of bodies best adapted to your line of business.

"The Blue Book of Traffic" is sent upon request, and is absolutely free of charge.

A postal card with your name and address will bring your copy by return mail.

The BLUE BOOK of Traffic

Federal Motor Truck Company

Dept. A DETROIT, MICH.

CRAMP

Gear Bronzes

Metals look much alike. Before buying metals it is vitally important to consider the experience and reputation of the manufacturer; — to know that the metals you use possess the qualities that will stand up in service and give the maximum of efficiency and wear.

The name CRAMP has for nearly a century set the highest standard in bearing metals. Cramp's metals are the result of almost a hundred years' experience. They have been used during these hundred years for worm drives for every type of machine—from turret-turning gear to lifting bridges, elevators, marine railways, etc.

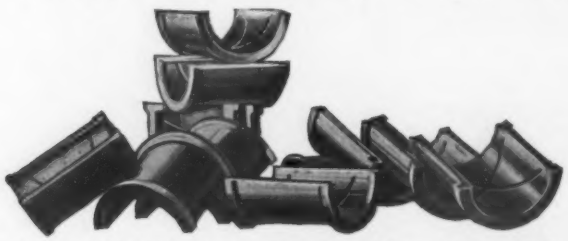
Cramp's metals will give longer life—resist wear and abrasion better—will withstand excessive strain and shock and heavier starting torque than any other gearing metals. Through merit alone Cramp's metals have achieved dominant place as the world's best metals.

It is no advantage to import metals, we manufacture absolutely the best, and save you duty, freight and time.

We furnish the metals and castings for Hindley Spiral Gears.

Write us—we can show you how Cramp's metals will better your products.

Parsons' White Brass and Cramp's Special Bearing Bronze



Acknowledged the world's best bearing metals

Specify PARSONS' WHITE BRASS for main engine and crank-pin bearings, and CRAMP'S SPECIAL BEARING BRONZE for wrist-pin, cam-shaft, transmission bearings, valve-stem guides and similar bearings

WRITE FOR PAMPHLETS AND PRICES

The Wm. Cramp & Sons Ship & Engine Bldg. Co., Philadelphia, Pa.

When Writing, Please Say—"Saw Your Ad. in the C C J"

Lippard-Stewart

The Delivery Car

The Lippard-Stewart 1500 lb. Panel Body Delivery Car, 30 H. P., $1800

You Have a Complete Line of Delivery Cars When You Handle the Lippard-Stewart

Every business man is interested in the money-saving, time-saving, business-building opportunity that the Lippard-Stewart line presents to him.

The Lippard-Stewart is built for delivery purposes exclusively, by men who for years have been giving **all** their time to the development of the delivery car—not making them as a side line to a pleasure vehicle business.

Lippard-Stewart delivery cars appeal to merchants because of their efficiency. They are simple in construction; this makes for low upkeep cost. They are powerful—they are dependable. They do their work quickly and quietly. These qualities enable Lippard-Stewart users to deliver more packages over a greater area, in less time and at less cost per package, than they ever thought possible.

With Lippard-Stewarts you don't have to *tell* a man you can make a car suited to his special needs—you can *show* him. Look over this range of models and consider their attractive prices:

Panel Body, 30 H. P., $1800
Box Body, $1775
Police Patrol, $2325
Omnibus, $2325
Express Body, with top, $1775
Stake Body, $1775
Ambulance, $2325
Undertaker's Casket Wagon, $2300

Users of Lippard-Stewart 1500-Pound Delivery Cars

The hundreds of big users of Lippard-Stewart Delivery Cars had to be *shown* just as *you* can show *your* clients. These users are ordering new Lippard-Stewarts constantly:

NEW YORK CITY
Forsyth's Department Store
Rogers-Peet Co., Clothiers
Parcels Post Service
Dow Lunch Co.
Stern Bros. Department Store
Browning, King & Co., Clothiers
McPartland & O'Flaherty, Dry Goods

PITTSBURGH, PA.
James Lowrie & Sons, Undertakers
Kuhn & Bro., Grocers
W. R. Kuhn & Co., Grocers
Boggs & Buhl, Department Store
Meyer & Jonasson Co., Dry Goods

PORTLAND, ORE.
Chanslor & Lyon, Motor Supplies
Olds, Wortman & King, Dept. Store
Graves Music Store
Ballou & Wright, Motor Supplies
Meier & Frank, Department Store

BUFFALO, N. Y.
Hoefler Ice Cream Co.
Buffalo Courier
Larkin Co., Soaps

SAN FRANCISCO, CAL.
Hale Bros., Department Store
Arnstein & Simon, Woolens
White House, Dry Goods

Special Features: Continental 30 H. P. Motor; Eisemann Magneto; Brown-Lipe Selective Transmission; Cone Clutch; Full Floating Timken Rear Axles; Timken Roller Bearings throughout; Special Spring Suspension; Left-hand Drive; Pneumatic Tires, 35 x 4½, Front and Rear; Full Equipment of Lamps and Tools.

You Can Build a Business in Lippard-Stewart Cars

If you are the man who can grasp the big possibilities offered by the Lippard-Stewart line, and handle it in the way it should be handled, we want to hear from you—right now.

Lippard-Stewart Motor Car Co.
Buffalo, N. Y.

AUGUST BECKER .....Pres. & Treas. | J. C. MILLAR .....Secretary.
E. J. BARCALO.....Vice Pres. | C. S. DAHLQUIST ....Chief Engineer.

(CCJ)
Lippard-Stewart Motor Car Co., Buffalo, N. Y.
Please send catalog and dealer's proposition.
*Name*_____
*Street*_____
*City*_____ *State*_____

Willys Utility Truck

$1250

(*Chassis Only*)

200% More Efficient; 30% Less Cost

It's not so much what a Willys Utility Truck can save as how much more it does accomplish. What you want is dollar production, not Penny Reduction. You have got to tune your business up to date and up to meet and beat competition.

You use many modern business necessities—not because they are cheap to install, but because they save that which you are continually figuring and fighting against—time.

A Willys Utility Truck can make from five to ten delivery operations where the horse makes one. It will do 200% to 300% more work than any team and do it so that the cost of your individual deliveries will be the lowest in the history of your business. And your business means any business that requires the transportation of merchandise.

As to cost, it is the lowest priced truck of its size and capacity built. On the average it costs you 30% less than any other similar truck made.

It is the only truck at the price that has a chain drive. The powerful 35 H. P. motor is controlled by our patented governor. The pressed steel frame is built to stand the most severe strains. It is thoroughly reinforced. Both the front and rear axles are unusually rugged, and are made in our drop-forge plant. It has a three-speed transmission—three forward and one reverse. The tires are 34-in. x 4½-in. pneumatic on the front wheels and 36-in. x 3½-in. solid on the rear. Its capacity is three-quarter ton.

Go to our nearest dealer. If there is none in your town, write us at once and you can deal with our factory direct.

Literature, detailed specifications, advice and all information gratis.

Please address Dept. 160

The Willys-Overland Company, Toledo, Ohio

When Writing, Please Say—"Saw your Ad in the C C J"

4,000 truck users have changed

from tires which they have tried and found wanting to Goodrich Wireless Truck Tires. Why not start right?

In one month 478 users of motor truck tires took off tires of various makes and substituted Goodrich Wireless Tires. Why? Because they were dissatisfied with continual adjustments and wanted the continuous service and economy of

GOODRICH WIRELESS TRUCK TIRES

These tires are equipping the trucks of thousands of concerns big and small. Here are a few of the businesses in which they are used:

Furniture Companies,	Sight-Seeing Bus Operators,	Express Companies,	Shoe Manufacturers,
Coal Dealers,	Wholesale Grocers,	Milling Companies,	Wholesale Butchers,
Fire Departments,	Oil Companies,	Wholesale Provision Houses,	Mining and Smelting Companies,
Transfer Companies,	Packers,	Ice Companies,	
Brewers,	Department Store Owners,	Hardware Store Owners,	Brick Companies,
Sand and Gravel Contractors,	Chemical Companies,	Plate Glass Manufacturers,	Stove Manufacturers,
	Bakers,	Storage Companies,	Soap Manufacturers.

Write for names of satisfied users of Goodrich Wireless Truck Tires in your line of business. Some of these concerns have delivery problems similar to yours. You'll be interested in learning their names and also in learning what their experience has been with the Goodrich Wireless Truck Tires.

Free booklets to help you

Write us on your business stationery and ask for any or all of the following books. We'll be glad to send them, without expense to you.

1—***"Motor Trucks of America"***—a condensed catalog giving the essential features of over 60 American-made Trucks. An authentic book of reference, compiled from data furnished by the truck makers for the busy man who wants to study Motor Trucks.

2—The Goodrich ***"Record of Cost"*** Book. This, with daily report cards which we also furnish free, enables you to tell just how much your trucks are costing.

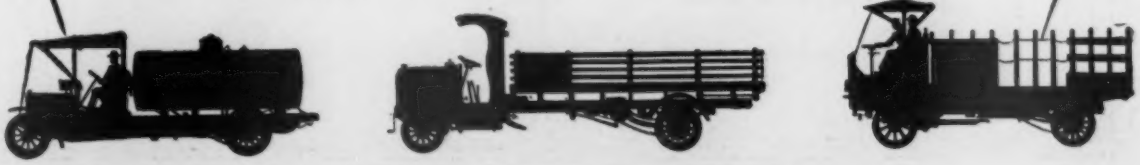
3—***"Goodrich Wireless Demountable Tires."*** An illustrated 40-page book which tells how Goodrich Wireless Tires are made, why they give steady, dependable service and also gives valuable ideas for the care of truck tires so as to get more mileage and better service.

The B. F. Goodrich Company

Makers of Goodrich Tires and Everything That's Best in Rubber

Factories, Akron, Ohio
Branches in All Principal Cities

There is nothing in Goodrich Advertising that isn't in Goodrich Goods



Packard

MOTOR TRUCKS

"Factor of safety" is a term used by bridge builders, architects and engineers. It means reserve strength to meet the unexpected.

Nearly four thousand Packard trucks are proving daily that the Packard "factor of safety" is the best guarantee of continuous service.

Ask the man who owns one

Two-ton chassis - - -	$2800
Three-ton chassis - - -	$3400
Four-ton chassis - - -	$3550
Five-ton chassis - - -	$4500
Six-ton chassis - - -	$4650

F. O. B. Detroit

PACKARD MOTOR CAR COMPANY, DETROIT

THE IDEAL, PRACTICAL SOLUTION OF THE FLORIST'S DELIVERY PROBLEM LIES IN A

Bessemer Truck

A Model C Bessemer Truck Rendering Efficient Service for a Cleveland Florist

Florists' deliveries present different problems from those of the average store. The perishable nature of the goods, the necessity of delivering in perfect condition and at a specified time, the demand for many deliveries to fall within a certain few hours of the day and the need for an unfailing, unfaltering service make a condition which a light weight, easily operated and controlled, rapidly moving and dependable commercial car ***alone*** can satisfactorily supply.

The Model C Bessemer meets these conditions to a remarkable degree and is rendering most efficient service to the florist trade, earning the same enviable reputation as it has in other lines of work. This is made possible by the excellence of its materials and parts and the high quality of its workmanship. If yours is a light, or medium weight delivery problem, consult us.

Three Models—Bodies to Suit Purchaser

A—3000 lbs. Capacity,	B—2000 lbs. Capacity,	C—1500 lbs. Capacity,
30 H. P.—Price, $2100	30 H. P.—Price, $1800	25 H. P.—Price, $1250

DEALERS: You can make a profitable connection by handling this truck. Write for our sales plan and literature

BESSEMER MOTOR TRUCK CO.

BESSEMER

GROVE CITY
PENNSYLVANIA

BESSEMER

Universal Agents are making money out of Universal Trucks—

Why? Because the trucks give good service and we treat the Agents right—

Here's a list of them: Write and see what they have to say about it. Then write us for our sales proposition—

Universal Motor Trucks

List of Universal Dealers

Colonial Motor Car Co.,
Baltimore, Md.
Universal Truck Co. of N. E.,
Boston, Mass.
Foran Furniture Co.,
New London, Conn.
E. A. Eddy Machinery Co.,
Providence, R. I.
A. B. Lewis,
Springfield, Mass.
E. E. Dodge,
Worcester, Mass.
Mason B. Hatch, Inc.,
Buffalo, N. Y.
C. P. Derr,
Chicago, Ill.
Cincinnati Motor Truck Co.,
Cincinnati, Ohio.
Universal Truck Co. of Cleveland,
Cleveland, Ohio.
Arend Motor Trucking Co.,
Akron, Ohio.
Standard Garage Co.,
East Liverpool, Ohio.
R. J. Macklin,
Station A, 807 Woodward
Ave., Detroit, Mich.
M. N. Plumadore,
113 West Wayne St.,
Fort Wayne, Ind.
Eastern Motor Car Co.,
Los Angeles, Cal.
M. E. Grable,
146 West 63rd St.,
New York, N. Y.
James McLay,
New Haven, Conn.
E. A. Perkins Electric Co.
Torrington, Conn.
Riley & Barnes,
Paterson, N. J.
Paxton Motor Car Co.
San Diego, Cal.
Lindsay Motor Car Co.,
St. Louis, Mo.
Star Carriage Co.,
Seattle, Wash.
Mississippi Motor Truck Co.,
Vicksburg, Miss.
U. S. Motor Sales Co.,
Johnstown, Pa.
Hub Machine & Welding Co.,
Philadelphia, Pa.

UNIVERSAL MOTOR TRUCK COMPANY

Detroit FRED K. PARKE, General Manager **Michigan**